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VIEWS, NEWS AND INTERVIEWS.

It is reported that in Australia horses and cattle are now being branded by electricity from storage batteries. The brand is said to be safe and artistic.

After the fuse on a trolley car had blown out, according to a daily paper, the motorman promptly shut off the current, tinkered up matters with a nail and started again.

"That other feller was scared," he remarked, looking curiously at a stolid passenger.

"He seemed so."

"It didn't seem to worry you for a cent."

"Not in the least."

"Almost burnt your mustache, didn't it?"

"More than almost," rejoined the passenger calmly.

The motorman looked around with mingled respect and curiosity.

"Are you a lineman?" he asked.

"No."

"Electrician, may be?"

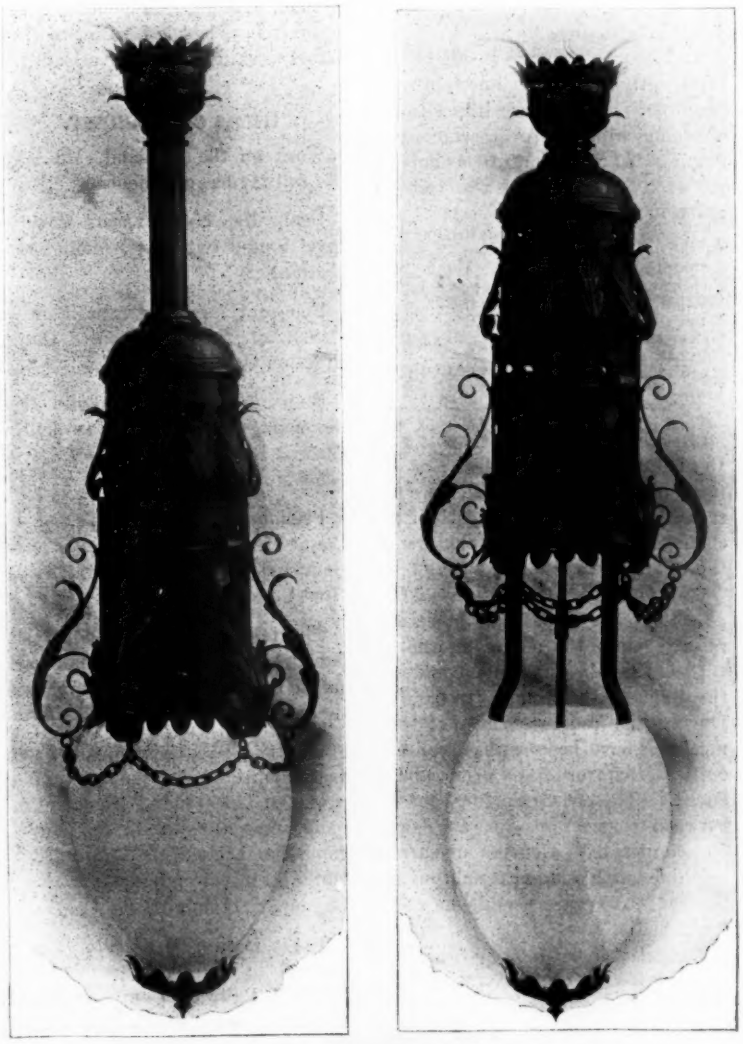
"Nothing of that sort," said the passenger, quietly knocking the ashes off his cigar. "I'm the foreman of a dynamite factory. I had four men blown into slivers only this forenoon, and I expect to be slivered myself any moment all day long; so your little blowout wasn't even worth winking at. Is the next street mine?"

The motorman didn't answer the question. He clamped down the brake and turned square around to his passenger.

"Shake," he said, admiringly. "I've got a tolerable record myself. I've been on this road for four months and I've trolleyed three old women and a kid; but I ain't in it wid you. I'm glad I met yer. Yer a daisy."

I am reminded of another man who figured to no inconsiderable extent in the early operations of the Thomson-Houston company, says a writer in the Boston *Record*. That is J. F. Meech, who served so excellently as adjutant to ex-Commander-in-Chief Adams while at the head of the Grand Army of the Republic. He was the resident agent of the company in London for a long time, and many of its most extensive European contracts were conducted by him, although he long ago severed his connection with the company. I met him in Boston not long ago. He still bears the same impressive appearance and is the same genial conversationalist as of old. I understand that he is busying himself now in a number of new industrial enterprises in Massachusetts, and is particularly interested in the manufacture of pearl buttons. Erstwhile he gives considerable time to his townspeople as secretary of the Board of Trade.

At a meeting of the Leather Belting Manufacturers' Association of the United States, of which Mr. Pliny Jewell, of P. Jewell & Company, Hartford, Conn., is the president, held in New York on April 17, it was unanimously voted to join the National Association of Manufacturers of the United States of America, and to be represented at the annual meeting, to begin October 15, in Chicago.



FORT WAYNE ELECTRIC CORPORATION'S NEW ORNAMENTAL ARC LAMPS.

The Fort Wayne Electric Corporation's New Ornamental Arc Lamps.

On this page is illustrated a new type of ornamental arc lamp manufactured by the Fort Wayne Electric Corporation, of Fort Wayne, Ind. This lamp deserves notice as it contains a new and novel feature which facilitates trimming. The illustrations show the lamp ready for burning, and with the ornamental casing raised exposing the feed rod and carbon holders for trimming, completely obviating the difficulty in keeping the feed rod clean and adjusting the carbons in line. This casing is held up in position by a bayonet joint at the top of the suspending tube, where it in no way interferes with the attendant during the act of cleaning the globe or trimming the lamp. When it is lowered into place it acts as a most effective spark arrester. The design of these lamps, and, in fact, the whole apparatus, from an artistic point of view, leaves little to be desired. They are manufactured either single or double of any candle-power, and wound for constant current, constant potential or street railway circuits, while the cases are finished either in brass or old iron to suit the requirements of the purchaser.

Meekin's Adventures Inspire a High Compliment.

[*From the Atlanta Constitution.*]

In perusing a scientific journal it is an agreeable surprise to find sandwiched with articles profound an occasional semi-scientific effusion of such humorous quality as to excite our risibles, while at the same time it gratifies our curiosity. The ELECTRICAL REVIEW is a periodical that, while it strictly maintains its high standard for technical research, yet is so interspersed with amusing articles in its own peculiar line as to make the REVIEW a most agreeable journal to the general reader.

The street railroads in the vicinity of Boston continue to show an increase in earnings while expenses are being reduced.

POLYPHASE CURRENTS FOR LIGHTING AND POWER IN A FACTORY.

BY M. P. BOUCHEROT IN "BULLETIN DE LA SOCIÉTÉ INTERNATIONALE DES ELECTRICIENS."

The author first points out the two distinct advantages of employing electricity as a motive power for driving factories. In the first place, large steam units are more efficient than small ones, and, for equal power, cost less. In the second place, the losses incurred by heavy mechanical transmission are done away with. In Messrs. Weyher & Richemond's works this second advantage could, however, only be partially realized, as electro-motors were only employed for driving newly installed machine tools.

After due consideration, it was decided that the system of distribution should be with two phases at a pressure of 110 volts. In deciding whether alternating or continuous currents should be used, the following points had to be considered :

1. The available capital. 2. Efficiency of the system. 3. Practical advantages and disadvantages. 4. Cost of maintenance.

Two-phase currents were chosen in preference to simple alternating currents for the following reasons :

1. Polyphase motors and generators have a higher specific output and efficiency than single-phase machines.

2. Polyphase motors are more easily started than single-phase motors, the initial torque being about 10 times greater. Moreover, on constant potential circuits the torque with polyphase motors varies inversely as the speed and are not subject to sudden stoppage when overloaded, as is the case with single-phase motors.

The speed of the former may be varied by the introduction of resistances in the armature circuit, but not so with the latter.

Two-phase currents were adopted in preference to three-phase currents, for the following reasons :

1. Two-phase currents are better adapted for the combination of motive power and lighting. The variations of voltage with load are much smaller with the two-phase than with the three-phase system. With the former, if the two sides be fairly well balanced, and one side be fully loaded and the other side half loaded, the variation in voltage will not be more than two or three per cent.

2. The cost of construction is cheaper with the two-phase system for both motors and generators.

The shops consist of several buildings, covering an area of about 25,000 kilometres, and were formerly driven by three steam engines of 80, 120 and 50 horse-power.

The new installation consists of a group of five boilers, of which three are used for running the engine and the other two for testing engines and dynamos. The main engine is of the horizontal single-cylinder type. Its maximum output is 400 horse-power at 60 revolutions per minute, and its most economical load is 200 horse-power. This engine drives a countershaft, driving :

1. One continuous-current dynamo with an output of 110 volts, 100 amperes, used for exciting the alternators, and of which 50 amperes are available for testing purposes.

2. A small three-phase machine, used for working an overhead traveler and for testing three-phase motors.

3. Three alternators of 130 horse-power each, one of which is fitted with a magnetic coupling.

The above countershaft is extended into the dynamo-testing shop in order that another engine may be used in the event of the large engine breaking down.

The three 80-kilowatt alternators are each capable of delivering 400 amperes per phase, and work at 40 periods per second. They have 12 external stationary poles.

The following is a comparison between the above machines and continuous-current machines manufactured by the same firm :

1. *Price.*—The price, including the exciter, is 10 to 20 per cent lower than that of continuous-current machines, on account of their great simplicity and lightness ; the weight of the above machines being about 4,500 kilogrammes.

2. Their efficiency is about the same as that of a continuous-current machine. The various losses in the above machines were ascertained by driving from a continuous-current motor. The results of the test are given in the following table:

	At Full Load.	At Half Load.	At Tenth Load.
Armature losses....	2,280	570	20
Field magnet losses.	1,520	1,460	1,400
Friction.....	640	640	640
Windage.....	1,000	1,000	1,000
Hysteresis.....	1,160	1,130	1,100
Internal and Foucault currents...	1 760	1,700	1,600
Useful power.....	88,000	44,000	8,800
Total power.....	96,360	50,500	14,560
Efficiency.....	0.913	0.872	0.605

By reducing the windage of the machine the efficiencies were increased to 0.93, 0.89, 0.65. If the efficiency of the exciter be considered, the figure 0.913 becomes 0.912.

3. *Practical Advantages and Disadvantages.* — The usual objections raised against the use of alternators is their large drop in voltage and also the difficulties of running in parallel. During the four months that these machines have been working no difficulties whatever have been experienced. The synchronizing current between two machines does not exceed 50 amperes. Continuous-current machines with a larger synchronizing current than this would no doubt spark badly.

4. *Cost of Maintenance.*—This item will be lower, on account of the absence of commutators.

The distributing mains consist chiefly of eight cables of 75 square millimetres section, coupled two and two in parallel.

The following comparisons were made between alternating and continuous-current motors:

1. *Price.*—This is about the same for both systems, taking into account the necessary starting apparatus.

2. *Efficiency.*—The results of tests have shown that the efficiency of alternating current motors is, on an average, about two or three per cent higher than for continuous-current motors.

3. *Practical Advantages and Disadvantages.*—These polyphase motors may either have squirrel cage armatures or armatures designed for inserting a resistance in their circuit.

Motors above two or three horse-power with squirrel cage armatures must be started by means of a transforming device connected to the line itself, in order to diminish the rush of current on starting.

Under these conditions the speed cannot be varied. The armatures, which are designed for placing resistances in their circuits, are usually wound three-phase, and are fitted with three collector rings, to which a suitable rheostat is connected. By this means the speed can be varied. Apart, however, from electric traction work, variable speed motors are not in great demand.

4. The cost of maintenance of rotary field motors is very low, and consists mainly in refilling the oil reservoirs.

The loss in the line is about four per cent, and the efficiency of transmission between the generator and motor pulleys is 0.785, with two alternators working slightly overloaded.

ITEMS OF INTEREST.

Work on the Portland, Me., electric railway has commenced.

Louisville, Ky., expects soon to have long-distance telephone connection.

Five-cent fares now prevail on the system of the Bridgeport, Conn., Traction Company.

Frank B. Smith has resigned from the management of the Metropolitan Electric Railway Company, of Springfield, Mo.

President E. H. Phipps, of the Connecticut Pipe Manufacturing Company, New Haven, Conn., visited New York last week.

The telephonic anti-monopoly bill died in Albany last week, nor is its corpse likely to be disturbed. Peace to its ashes.—*Yonkers, N. Y., Herald.*

Lieut. J. B. Cahoon, for several years connected with the Lynn, Mass., works of the General Electric Company, was appointed, on May 1, general manager of the Elmira, N. Y., Illuminating Company *vice* F. A. Cheney, resigned.

Judge Dallas, of Philadelphia, has decided in favor of the Gettysburg Electric Railway Company in the litigation over the taking of land by the government from the company for the purpose of preserving the Gettysburg battlefield.

In asking for a perpetual franchise the Detroit Harrison Telephone Company is much more generous to itself than it is in its proposed terms to its patrons. The ordinance asked for needs a very careful revision before it can justly receive the sanction of the council.—*Detroit Free Press.*

At the power station of the Braintree and Holbrook, Mass., Street Railway, on April 22, a pulley connected with the generator burst, tearing a hole through the building. A piece of steel hit the engineer, making a severe wound on his head and leg. About $600 damage was done.

A statement of the earnings, operating expenses, deductions from income, and net income for the Brooklyn Heights Railroad of Brooklyn, N. Y., for the quarter ending March 31 of the current year, which covers the period of the strike, shows a net deficiency on that date of $415,956.28.

The Brooklyn, N. Y., Board of Aldermen have appointed 14 men at $3 per day each to inspect the running of electric cars in that city and see that they conform to the city ordinances. The resolution of Alderman Walsh to allow passengers to enter or leave trolley cars by the front door was adopted.

New Orleans people are disgusted with the electric cars, which have been running but a short time, and there is a loud cry in favor of a return to mule power. There is an epidemic of coughing and sore eyes among the people, and it is attributed to the clouds of dust stirred up by the fast moving trolleys. New Orleans is in no great hurry and begins to think that the mules were about right after all.—*New York Mercury.*

Mr. Richardson's successor as the secretary of the American Street Railway Association will be selected by the executive committee, which is composed as follows: President, Joel Hurt, of Atlanta, Ga.; first vice-president, W. Worth Bean, of St. Joseph, Mich.; second vice-president, John H. Cunningham, of Boston ; third vice-president, Russell B. Harrison, of Terre Haute, Ind.; Henry C. Payne, of Milwaukee, Wis.; Wm. H. Jackson, of Nashville, Tenn.; D. G. Hamilton, of St. Louis, Mo.; Granville C. Cunningham, of Montreal, Que.; and Col. John N. Partridge, of Brooklyn, N. Y.

A meeting of the stockholders in the Inter-State Consolidated Street Railway Company was held recently at the banking rooms of Marsden J. Perry, Providence, R. I., for the purpose of effecting an organization. As a result of this meeting the Inter-State system will probably be in running order in a very short time. The charter passed by the legislature of Rhode Island was accepted and this action formerly organized the company. By-laws were also adopted and a board of directors consisting of the following gentlemen was elected: Marsden J. Perry and Henry R. Baker, of Providence; Lyman B. Goff, of Pawtucket; Clarence L. Watson, of Attleboro; Henry F. Barrows and Edward P. Price, of North Attleboro. Subsequently these gentlemen met as a board of directors and organized and elected the following officers: Marsden J. Perry, of Providence, president, and Edward R. Price, of North Attleboro, treasurer and secretary.

The Danbury Electrical Works' Telephone Apparatus.

The Danbury Electrical Works, of Danbury, Conn., are manufacturers of an extensive line of telephone apparatus and supplies. Several of their instruments are illustrated on this page. Fig. 1 shows a carbon telephone for exchanges and long-distance work which the makers style the "Russell, No. 40." The bells are warranted to ring through 10,000 ohms and there is an absence of unsightly connecting wires on the instrument. The carbon transmitter, not of the Blake pattern, embodies every good point in the construction of the old long-distance transmitter and all up-to-date improvements that places it far in the front rank as a powerful transmitter, and expressly adapted for communicating with distant points. Every instrument is carefully tested and adjusted before leaving the works. The mouth-piece is black electrose composition highly polished. A

Fig. 1—Long Distance Carbon Telephone.

special feature of all this firm's instruments is that the diaphragms and back plates are made of silver, the best conducting metal known. These make the very best possible contacts with granular carbon.

In Fig. 2 is shown an angle telephone in which the receiver and transmitter are made in one piece. This instrument is a powerful carbon telephone designed for office work or where the convenience of a desk set is needed. It will readily be seen that when the receiving end is placed to the ear the transmitter will naturally come directly in front of the mouth, giving the user perfect freedom; he may write, turn around, lean on the desk or get into any position most convenient for long conversations. This will be greatly appreciated by many, as we all know how tiresome it is to stand in one position holding a heavy receiver to the ear while using the telephone for any length of time. These sets are finished in full nickel except the rubber caps and handle.

Fig. 3 illustrates an instrument for local exchange or long private line service and is a very compact set. The bells are for 6,000 ohms and the transmitter is placed in the front of the bell box.

The Danbury Electrical Works manufacture all necessary material for the construction of telephone plants. Their office is Room 334, Central Building, 143 Liberty street, New York city.

Fig. 2—Angle Telephone.

ELECTRIC RAILWAY NOTES.

The Toledo, Ohio, Electric Street Railway Company has increased its capital stock from $1,400,000 to $1,750,000.

The Board of Trade will petition the Common Council of Scranton, Pa., to have the electric cars there provided with fenders.

The charter granted the Carpentersville, Elgin and Aurora, Ill., Electric Road by the supervisors, requires that the road be completed within nine months.

A bill has been reported to the Massachusetts Legislature incorporating the Boston, Lynn & Beverly Street Railway. This road is planned for the Boynton bicycle car.

The Nassau Electric Railroad Company, of Brooklyn, N. Y., will open its first line, that from the foot of Broadway to Canarsie, on May 10. Only a single fare of five cents will be charged for the trip.

The White-Crosby Company, of Baltimore, last week secured an $80,000 contract for the complete construction of a five-mile extension to one of the Baltimore City Railway Company's lines.

The Senate bill authorizing a street railway in the State reservation at Niagara Falls should be killed with exemplary promptness. It is an impudent proposition. The reservation is for pleasure, not money-making. —*New York Times.*

In the late report of the Massachusetts Board of Railway Commissioners it is shown that the business of the street railway companies is far more stable than that of steam roads under all conditions. It is shown that there is a great difference in the effect of business depression on the two kinds of transportation.

The electric roads will do a great deal to render accessible to tourists some of the most delightful localities in New England which have hitherto been accessible to only a few. Maine affords many such regions which will be open to the traveler by the trolley. The Ossipee Valley in New Hampshire will be one of the first to have an electric line constructed through it.

Michael Lower, of New York city, one night last week attempted to shoot Alexander Arnold, a motorman on a trolley car, at Sixty-fifth street and Third avenue, Brooklyn, N. Y. Lower wanted to stand on the front platform, and when Arnold objected a fight followed during which Lower pulled his pistol. A policeman came to Arnold's assistance and Lower was arrested.

The Atlantic Avenue Railroad Company, of Brooklyn, N. Y., last week ratified the settlement of their trouble with Austin Corbin. Under the agreement the Brooklyn, Bath and West End road will vacate the Union Depot, and cars will run without transfer to Coney Island from the bridge. The present closed cars will run through and new open ones be constructed. Benjamin Norton was re-elected president; John P. Ilsley, vice-president; and Benjamin Frick, secretary.

Fig. 3.—Local Exchange and Long Private Line Telephone.

Judge Speer, of the United States Court, has placed the City and Suburban Railway, of Savannah, Ga., in the hands of Col. John Screvin as receiver. The road includes 17 miles of electric railway in and outside the city. The stock of the road is practically entirely owned by George Parsons and J. N. Harriman, of New York city. The property is bonded for $200,000. A Tennessee bondholder, on whose bill the receiver was appointed, charges that Mr. Parsons is wrecking the road.

The report of the Brooklyn City and Newtown Railroad Company, of Brooklyn, N. Y., for the quarter ended March 31, filed with the State Railroad Commission last week, shows gross earnings from operation, $156,562; operating expenses, $101,688; net earnings, $54,873; other income, $77; gross income, $54,950; fixed charges, $31,694; net income, $25,255; cash on hand, $46,646; profit and loss (surplus), $200,660. The net income for the corresponding quarter last year was $12,699.

The sale of the New Brunswick, N. J., City Railway to Gottfried Krueger and Andrew Rodel, of Newark, was consummated on April 30. It is said to be the purpose of the buyers to gridiron Middlesex county with trolley roads as fast as they can obtain the right of way. Thomas Murray, the contractor for electric and other railroads, is to build the road in New Brunswick and suburbs, as it is the intention of the new owners to extend the line to Milltown and South River, and eventually to South Amboy and Bound Brook.

The State Railroad Commissioners, Samuel A. Beardsley, chairman, Alfred C. Chapin and Michael Ricard, met last week in New York city. The chief business before them was the applications of the Metropolitan Traction Company for authority to use an underground electric system on the Lenox avenue route, and to use the cable system on the Twenty-third street cross-town line. H. A. Robinson stated that the requisite consent of the property owners had been secured in each instance, and that there was no limitation as to speed on the New York lines. Regarding the Lenox avenue application, Mr. Robinson said the main purpose was to construct an underground electric line from the Harlem River along Lenox avenue to 116th street. The Board made an order granting the two applications.

The building of the first link in the New York and Philadelphia Traction Company's projected system of trolley lines, which was started between Somerville, N. J., and Bound Brook a month ago, is now at a standstill, but little more than one mile of track having been laid. The true reason for the delay has just leaked out. It is a clever move on the part of the Central Railroad Company of New Jersey against the dangerous rivals on a writ of certiorari, which will probably delay further construction of the trolley road until the constitutionality of the law which now enables the Traction company to secure franchises to construct its road along the public highways is tested in the Supreme Court of the State. This move on the part of Central officials is a serious menace to the whole projected system of the New York and Philadelphia Traction Company, which is calculated to connect practically with every steam road in the State, and with almost every electric road between the Hudson River and Cape May.

AN ENGLISH MUNICIPAL LIGHTING PLANT.

AN INTERESTING EXAMPLE AFFORDED IN MANCHESTER, ENGLAND.

In view of the natural interest at present prevalent on the question of the control of the electric light and power of a city by the municipality itself, the following figures of the cost of the municipal plant in Manchester, England, are instructive on, at any rate, one aspect of the case.

The population of the city proper is a little over half a million, but as it is the nucleus of a network of towns and populous districts whose individual populations range from 25,000 to 125,000, it is really the center of an area inhabited by an enormous number of people. The corporation of the city owns and operates the waterworks, gas works, markets, abattoirs, cemeteries, street car tracks, technical schools, etc., and is also a very large holder of stock in the company which has constructed a ship canal some 40 miles long, enabling vessels from New Orleans to land cotton in the very heart of the cotton manufacturing district. On the whole, Manchester is one of the best governed cities in the British Isles.

Owing to the fact that the municipality owns the gas works, the streets have so far been illuminated with gas. This is of good quality and costs the private consumer within the city 60 cents per 1,000 — beyond the city limits it is a few cents higher.

The plant installed by the city in 1893 is low tension, on the five-wire system, and cost in all $803,030.

This total is made up as follows:

Real estate	$219,417
Buildings	117,967
Steam and electric plant	174,273
Mains and cables in streets (total of 61 miles.)	237,764
Electrical instruments	3,611
Meters	29,263
Consulting engineer	20,825
	$ 03,030

The original intention was to provide for about 20,000 incandescent lamps of 16 candle-power each, but extra provision was made in the way of real estate and buildings, so that the capacity could be doubled. The demand for the electric light, even as against the competition of the good and cheap gas, has been surprising. In September, 1893, 4,000 sixteen candle-power lamps were connected, in September, 1894, nearly 24,000 and in March, 1895, over 34,000, and a considerable demand exists for more. The first year's working resulted in a loss of about $1,000, but the year from March, 1894, to March, 1895, showed a profit, after deducting interest and sinking fund, of about $35,000, to go in reduction of city taxes. The price per kilowatt hour has been 16 cents, but is to be reduced to 12 cents; this, with 60-watt lamps, it will be seen, gives a cost per 16-candle-power-lamp hour of 0.72 cents, while 60-cent gas at five feet per hour costs per burner 0.3 cents.

The city is now contemplating the expenditure of nearly half a million dollars additional in extension of mains and further steam and electric plant. Along several miles of streets, covering a zone exterior to the present district, are to be laid five conductors of one-half inch sectional area each, so that before long it is practically certain that the full capacity of the plant will be reached.

Now, is not here an encouragement to the advocates of the municipal control of lighting enterprises? If one city can go directly into the commercial business of incandescent lighting and make an annual profit of $35,000, why cannot another economically do its own work of public lighting? *Because the conditions are different.* This is and has been throughout the municipal control discussion, a point of view lost sight of by those who think that the Hibernian rule of American cities is such as to induce us to place further powers in the hands of an essentially alien race.

Because the conditions are different, Glasgow (with a population larger than that of Boston) expends $60,000 on the service of extinguishing fires, as against Boston's $800,000, and for the same reason the New York Fire Department costs twice as much as that of London (see Shaw on "Municipal Government," etc.).

Comparisons of mere figures are, therefore, deceptive, unless made with due regard to the attending conditions.

Now, the conditions affecting the plant here more particularly under consideration are briefly (and for the most part in marked contrast with those in our own cities), as follows: 1, honesty; 2, efficiency; 3, permanence and solidity of work; 4, cheapness of fuel and labor; 5, high load factor.

The municipal conditions in an English city are widely different from those obtaining here. The members of the City Council are the respectable and solid men of the community, not always the richest or of the very highest intelligence, but not criminals or quasi-criminals. They are almost invariably honest and possessed of good business ability. The actual executive officers and men are appointed on their merits, and the pay rolls are not loaded down with political heelers and mere voting material.

All work executed is good and solid, though perhaps somewhat slowly done, as compared with our methods, and is put to stay. The streets are not continually being ripped up by anybody and everybody, and not restored again, the control and usually the execution of all street excavation being actually and absolutely in the hands of the city.

Manchester being in the heart of the Lancashire coal producing district, coal is naturally cheap, and the city being large purchasers by reason of their gas works (frequently making contracts extending over a term of years and covering hundreds of thousands of tons), coal is obtained at absolutely "rock bottom" prices. They also furnish water from the city waterworks for nothing (though as a matter of accounts something may be charged), and this water is almost absolutely pure, thus avoiding much scale and cleaning of boilers, while owing to the much lower cost of living labor is cheap.

The average load on the station and average loads of individual customers are necessarily high (we regret that we cannot at this moment furnish curves and figures in detail), for the reason that the city is a dark one; the proportion of cloud, fog and rain is vastly greater than in the average American city, in addition to which the amount of smoke is very considerable. The streets are not so wide for the most part in the business district as those of our cities, and in many establishments artificial light is used to a large extent the whole day. In Winter the days are short and fogs of the densest nature are not uncommon. The atmosphere is humid and heavy, and in crowded places the less additional carbonic oxide given off is a material advantage.

Another reason for the hitherto rapid and extensive growth of the electric light is the fact that the district so far supplied is the very cream of the lighting, the "fat" of the business. It includes within it most of the large stores, clubs, hotels, billiard rooms, restaurants, offices, bar rooms, warehouses, packing rooms and other places where a heavy day load may be looked for, as well as the theaters and places of amusement.

For these reasons, although the "peak of the load" will not perhaps vary much as to time of occurrence from what it is here, yet it will not be nearly so accentuated, and extend over more hours, while the daylight load properly, so called, will average high.

The extensions now contemplated will cover more of the factories, railway stations, workshops and some residential work, and assist in evening up the load line in the early morning and night work, at the same time adding somewhat to the day load.

It is probably not disputed that if the ordinary principles of business were applied to our systems of government, national, municipal and local, there is no inherent reason in the nature of things why a municipal plant or any other public enterprise could not be operated as economically as a private business. This, however, not being the case we must look at matters as they are. Max O'Rell says that John Bull rules his servants, but that Jonathan is ruled by his; if we will not pay the price of eternal vigilance we cannot ask for delivery of the goods.

The figures we have quoted show two things, that a large demand does (even in so conservative a place as England) exist for electric light, even at twice the cost of gas and that a municipality *can* make the business of electric lighting pay; with the somewhat important proviso that the kind of municipality shall be different, and most of the other conditions different also from those existing in the average American city.

ON THE TEMPERATURE OF THE ELECTRIC ARC.

BY J. VIOLLE IN "COMPTES RENDUS."

When working with currents of 1,000 and 1,200 amperes, the author confirmed the fact, lately published by M. Moissan, that the temperature of the electric arc increases with the current intensity. On taking photographs of the positive crater, it was found that the brilliancy at 1,000 and 1,200 amperes was the same as at 10 amperes, which tends to show that the crater is the seat of some physical phenomenon, characterized by a constant temperature (boiling point of carbon). The spectra of the crater and of the arc itself were observed, and the luminous intensity was found to differ in two cases.

An attempt was made to determine the temperature of the arc by introducing into it a thin rod of carbon. When placed in the arc this rod was hollowed out on the positive side and grew on the negative side, the brilliancy of this cavity being about the same as that of the positive crater; the consumption increasing with the current.

A similar rod introduced between two poles of a similar metal is consumed differently according to the metal employed—slowly with copper, rapidly with zinc; moreover, in the latter case the temperature appears to be much above the boiling point of zinc (950 degrees). In conclusion, the author considers that the temperature of the arc is generally higher than that of the positive carbon, and that the temperature increases with the energy expended.

The Beach Village Telephone System.

To the Editor of Electrical Review:

I was much interested in the article "Automatic Telephone Exchanges," by Victor M. Berthold, in your issue of April 24, 1895.

It may be interesting in this connection to state that the Central New York Telephone and Telegraph Company installed, some two years since, an automatic exchange of about 25 stations in the New York State Hospital, Utica, N. Y., which is essentially the same thing.

It consists of a magneto ringing service and a battery talking service, with practically the same means of placing oneself in communication with a desired station; the same system of circuits controlled by a plug. It is known as the Beach Village System, and I understand was in use by the Central Union Telephone Company, Chicago, some considerable time before its adoption here.

Yours truly,
W. W. Nicholson,
General Superintendent Central New York Telephone and Telegraph Company.
Utica, N. Y., April 30.

Mr. A. P. Trotter has resigned the editorship of the London *Electrician* in order to devote his whole time to mechanical and electrical consulting practice.

Olbricht's Trolley for Conduit Railways.

The accompanying illustrations show an underground conduit electric railway invented by Benjamin Olbricht, of Brooklyn, N. Y., and for which he was granted a patent on November 29, 1892. Since that time Mr. Olbricht has made several changes in the details of construction and has added improvements to his system. The chief improvement claimed is

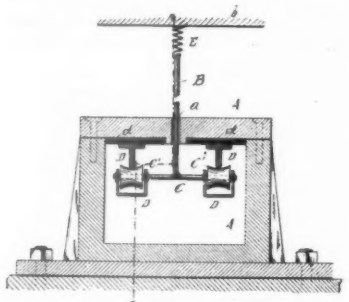


FIG. 1.—VERTICAL CROSS-SECTION OF OLBRICHT'S CONDUIT RAILWAY.

the method by which short-circuiting of the current by water is effectually prevented and the continuous contact of the trolley with the conducting rails obtained. The invention consists of an underground conduit formed of a closed box provided with a longitudinal slot in its top, metallic conductors attached to the under side of the top, one on each side of the slot and insulated from the top, and a trolley that is suspended by a hinged and spring-actuated arm from a car composed of two rollers, one in contact with each of the conductors, each roller being provided with a swinging casing or box to prevent short-circuiting in case the water should rise up to the level of the trolley in the casing.

In the accompanying drawings, Fig. 1 represents a vertical transverse section of the underground conduit; and Fig. 2 is a vertical longitudinal section on line 2 2, Fig. 1. Similar letters of reference indicate corresponding parts. Referring to the drawings, A represents an underground conduit of cast-iron, burnt

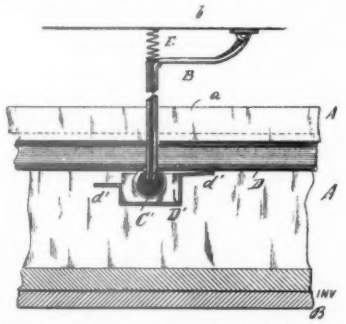


FIG. 2.—LONGITUDINAL CROSS-SECTION OF OLBRICHT'S CONDUIT RAILWAY.

clay or other suitable material. The top plate A′ of the casing is provided with a longitudinal slot *a*, through which the lever-arm B, that is hinged to the bottom of the car *b* and suspended by suitable springs E from the same, is conducted to the inside of the casing, the arm carrying at its lower end, at the inside of the casing, a trolley C, the rollers C′ of which form contact with metallic conductors D, that are attached to insulating plates *d*, which latter are supported at the under side of the top plate A′, as shown in Fig. 1.

The metallic conductors D are preferably made T-shaped in cross-section, so as to diminish the area as much as possible, the contact rollers of the trolley C being preferably grooved, so as to form a reliable contact with the metallic conductors D. The hinged suspension arm B serves as a support for the insulated conducting wires, by which the current is conducted to the electric motor on the car, the current being conducted from the metallic conductors to the metallic rollers and along insulated wires of the arm.

The casing or conduit A is to be provided with the usual drainage openings, so that any rain water which collects is readily drained off. In case, however, there should be a large accumulation of water in the conduit which might rise at some point so as to produce the short-circuiting of the current, the rollers are provided with hanging boxes or casings D′, which have at their front and rear ends projecting flanges or lips *d*′ that move along the conductors so as to protect the rollers and prevent the passing of any accumulated water to them.

Mr. Olbricht claims that his system can be operated on a regular constant current without any loss by short-circuiting or sparking, and that the construction is comparatively simple and inexpensive.

Cutting Names on Metal.

TO THE EDITOR OF ELECTRICAL REVIEW:

I happened to notice the letter of the Bradbury-Stone company in your issue of May 1, in which it is stated that a machine for cutting metal was owned by Mr. Dan Will, and that the last they heard of him he was in Rochester. Perhaps it may form an additional link in the chain to state that there is a Mr. Albert Will in Rochester, a manufacturer of stoves, furnaces, etc., located opposite the Livingston Hotel. The name being an uncommon one, it struck me that he might be able to give the address of Mr. Dan Will.

Yours truly,
W. H. M.

Harrison, N. J., May 2.

THE FIRST ELECTRIC CARRIAGE IN BOSTON.

A SNAP-SHOT BY AN "ELECTRICAL REVIEW" CORRESPONDENT.

The readers of the ELECTRICAL REVIEW will be interested in the illustration on this page giving a snap-shot view of the first electric carriage in Boston. The handsome *fin de siecle* vehicle, with its load of distinguished electrical men, is shown ascending a grade on one of the handsome drives of the Back Bay district.

C. W. Holtzer, ex-president of the "Electric Potential," a social organization of Boston electricians, kindly invited the governing committee of the "Potential" to take an electrical outing a few days ago, which was hugely enjoyed, not only by the parties directly at interest, but, if one may judge by the trail of bicyclists, the hundreds of visitors to the beautiful Back Bay Fens were also pleased and entertained by the novel sight of a fine English-built coach proceeding at a speed of from 12 to 15 miles per hour without horses or other visible means of propulsion. One young fellow was heard to inquire "Where is the trolley?" Another cautioned his companions not to touch the thing or it would kill them. Even the sedate old couples, behind their spans of bobtails, called to the coachmen to halt, while they opened their eyes and mouths to take in the unusual spectacle. The ELECTRICAL REVIEW correspondent happened to be on the other end of the camera when the shot was taken, so his presence does not materialize.

THE FIRST ELECTRIC CARRIAGE IN BOSTON.
(From a Photograph by Mr. I. H. Farnham.)

Westinghouse Sues Fort Wayne.

The Westinghouse Electric and Manufacturing Company, of Pittsburgh, on April 26, filed suit against the Fort Wayne Electric Corporation in the Federal Court at Indianapolis, Ind. The litigation involves the patent right to a distribution system. The Westinghouse company alleges that the Slattery system, used by the defendants, interferes with the Stanley system, priority for which has been held good by the Patent Office, and a decree is asked declaring the Slattery system invalid and void.

Death of A. M. Drummond.

Arthur M. Drummond, 21 years old, a student in the engineering department of the General Electric Company, died at Schenectady, on May 2, from typhoid fever. Mr. Drummond was graduated last year from Yale University, standing at the head of a class of 146. Being eager to complete a course in electrical engineering, he went to Schenectady about four months ago and became a student at the works of the General Electric Company. A little more than three weeks ago he was attacked with typhoid fever. His father, Prof. A. M. Drummond, is superintendent of schools in New Haven.

Brooklyn Heights Railroad Company Indicted for Manslaughter.

The Kings County Grand Jury on May 3 handed down an indictment in the Court of Sessions against the Brooklyn Heights Railroad Company, of Brooklyn, N. Y., for manslaughter in the second degree, based on the killing of Mary A. Medinger by a Court street trolley car in front of St. Paul's Catholic Church on the night of March 26. The indictment charges the company with operating their cars culpably, negligently, recklessly, carelessly, unskillfully and incautiously, and at an unsafe and improper rate of speed, and with failing to provide proper and effective life-saving fenders.

Waddell-Entz Patents Ordered to be Sold.

Judge Robinson, in the Superior Court in Bridgeport, Conn., recently issued an order for the sale of the patents, both in this country and Europe, belonging to the Waddell-Entz Electric Company. The company owned a storage battery and experimented on the Second avenue line in New York city. A large amount of money was spent on a plan to perfect a storage battery, and although the one devised worked well, it was said to be too expensive to be practical. Some time ago receivers were appointed in Connecticut and New York.

To Avoid Electrolysis of Water Pipes.

It is reported that experiments are being made in London with water pipes made of paper pulp, the object being to provide a pipe which will be unaffected by electrolysis from electric railway return currents. There is said to be some promise of success, but all the requirements have not yet been met.

At a meeting of the International Bell Telephone Company held in New York city last week the following directors were elected for the ensuing year: Samuel D. Babcock, Gardiner G. Hubbard, Louis A. Von Hoffman, R. A. McCurdy, Charlton T. Lewis, Elisha S. Converse, William Mertens, Howard S. Crandall, Louis A. Thebaud. It was voted to reduce the capital stock from $1,700,000 to $1,000,000.

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SPECIAL NOTICE TO ADVERTISERS.

***CHANGES** for advertisements must be in this office by Friday noon for the following week's issue.*
***NEW ADVERTISEMENTS** should be in the office not later than Saturday noon to insure publication the following week.*

NEW YORK, MAY 8, 1895.

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"My God, it does speak!" is said to have been the announcement of the first successful test of the telephone.

What a splendid opening Long Island presents for the trolley. Mr. Austin Corbin, the owner of the Long Island Railroad, should give this free suggestion careful attention.

The ELECTRICAL REVIEW publishes news. For instance, the General Electric annual report a week in advance of its contemporaries, the *Electrical Engineer*, *Western Electrician* and *Electrical World*. Spring fever, probably.

The Buffalo Electric Light Company declined to permit a new telephone company to string wires on its poles, and the local press at once discovers in this decision a combination of telephone and electric light monopolies. The moral is, get your own poles. Telephone wires are safer elsewhere, anyhow.

Every electric light station management should now plan improvements for completion during the Summer for the longer nights that follow. There is a way to place non-dividend paying plants on a better basis—and if you don't know how to do it, there are practical men who do and should be consulted.

WALL STREET AND THE ELECTRICAL STOCK MARKET.

The market of the week was steady to strong. The bear faction tried its best to weaken prices, but with little or no success. Underlying the list was a network of support which steadily advanced quotations and rendered them considerably higher than Monday's opening figures. The money market has not broadened to any extent proportionate to the advance. This is due to the views held by commission houses, who do not see how the rise can continue until there is a sharp reaction. The most significant feature was the heavy, broad and sustained market for bonds and at higher prices. The demand seems to exist for third and first-class securities, there being but little middle ground. A noteworthy feature was the heavy sale, through the exchanges and in blocks, of railroad bonds abroad. At least $10,000,000 have been placed. The effect of these transactions upon exchange reduced the price one-half and closed it weak. The trade reviews are most encouraging. They chronicle the usual fluctuations incident to the adjustment of business upon a new basis, showing that the raw material market is a leader in the advance. The demand, however, is broad, and the market is being established in buyer's favor.

The feature of universal interest in Wall Street this week was the General Electric report. The ELECTRICAL REVIEW scooped all competitors (except one, which printed an abstract in an extra supplement), by presenting a skeleton of this document. The printed report appeared some days later and chronicled a number of changes, none of which were important or in any way changed the value of the publication. The balance sheet was changed somewhat, although the totals were the same. The net profit of the year was given at $414,642. The Fort Wayne claim, which in your statement was placed at $1,176,665, and which was undoubtedly correct, was covered up in the other items, it being added to accounts receivable, sundries and profit and loss deficit.

During the year the company sold $1,307,298 securities and acquired $1,086,226, leaving a surplus of $222,071, which, with $885,996 liquidation of old notes and accounts, made a total of $1,108,068, which was used to buy the $1,250,000 of debentures canceled. The report was regarded as a very excellent showing, inasmuch as it returned earnings of 7 per cent on the preferred stock and 3.44 per cent on the common stock in a very bad year, barring, of course, the amounts written off out of earnings. The general view held by financiers was that it was decidedly favorable and pointed to higher prices for the stock. After the publication prices advanced about 1 point. At the top pressure was applied by the clique and the price went off. After the first movement it again hardened, and is now firm around the high figures of the week.

A very clearly defined rumor was current that D. O. Mills and H. McK. Twombley have resigned as directors of the company. I am able to state that they have not yet resigned, but there is a probability that they will do so soon. It is hinted that their resignations are contemplated because of certain complications growing out of the General Electric-Westinghouse deal. By-the-way, I hear that these negotiations are again on, and stand some chance of consummation.

The Edison Electric Illuminating this week was steady between 97¾ and 97¼. At a special meeting of the stockholders held May 1 it was voted to issue a consolidated mortgage of $15,000,000. A portion was to be used to retire outstanding mortgages as they mature, a small portion at the discretion of directors to acquire new plants, and the balance to be left in the treasury and not to be used in any one year to exceed $1,000,000. Over two-thirds of the stockholders voted for the issue. The debenture 5 per cent bonds outstanding sold at 106¼ to 107.

Westinghouse is reported to be doing a very heavy business. It is working night and day at its factory at Brinton and is employing 2,700 hands. The output of the railway department is 25 motors per day and will soon be increased to 30. The stock of the company was practically unchanged at 33 to 34 for the common and 52 to 52½ for the preferred.

On the Boston Exchange, Bell Tele-

phone hardened again this week, selling up from 183 to 188. There was sympathetic movement in other stocks. New England advanced from 67½ to 69. It later reacted. There was no change in Electric Storage Battery. Erie Telephone gained 2¼ points. BAIN.

Wall Street, N. Y., May 4, 1895.

President Coffin's Comments on the General Electric Report.

A condensed statement of the General Electric Company's annual report appeared in last week's ELECTRICAL REVIEW, and herewith are appended President C. A. Coffin's comments on the report:

In the last annual report your directors sought to exhibit the extent to which your company had suffered from the panic of 1893, and from other causes inherent in some of the enterprises in which it became interested at the time of its organization. Mention was made of the fact that the accounts receivable included $2,531,609.88 due by the Fort Wayne and Northwest companies and other allied interests. Contrary to the expectation of your directors, and the statements of persons directly interested in the Northwest company, your claim as a creditor of that company now proves to be without value; and certain other interests inherited by your company through the Northwest company are also valueless. The aggregate loss from these sources is about $945,000 (viz., $456,484.43 on the account owned, and about $489,000 on other items), and this sum is included in the charges to profit and loss in the supplementary statement for the year 1893 attached hereto.

During the past year the Fort Wayne Electric Company, a former ally of one of your constituent companies, has gone into the hands of receivers, and its affairs are now being liquidated by the court. Your company has filed with the receivers its claim for $1,137,555.48.

The balance sheet and the schedule accompanying it show the outstanding interests of your company as stockholder in manufacturing and other companies. Many of these securities will be sold as opportunity offers. Such a course will, in some instances, involve considerable shrinkage from former book values.

There exist also several unsettled contracts andedating the formation of your company, but which your company has to recognize, and which will cost, perhaps, $500,000 to settle.

To cover the estimated loss on all the matters above mentioned, your directors have arbitrarily charged $2,000,000 to profit and loss account, and the results, as shown at the head of this report, are after making this deduction.

Notwithstanding the adverse conditions of the past year, the output of your various factories at cost value was only slightly below that of the previous year. The output in the amount of material produced was considerably in excess of the previous year.

Special attention has been given to the supervision of credits, economy of administration and the improvement of factory facilities, and your directors and officers have sought to adopt every device calculated to increase the efficiency of manufacture and to reduce the cost of the manufactured product. In this they have been in a marked degree successful and great credit is due those officers and employés of your company directly in charge of manufacturing details.

In the last annual report mention was made of the shrinkage in inventory values of electrical machinery arising from new inventions and improvements, whereby types of machinery which have been the best of their kind are often rendered obsolete. It is impossible to guard wholly against loss from this source, inasmuch as it is essential for your company to keep on hand at all times a considerable stock of manufactured goods. Such stock has been greatly reduced in the past year, and it will be the policy of your board to keep it down to the lowest point consistent with prompt filling of orders. This, together with the work accomplished in developing standard types of apparatus and supplies, warrants belief that the loss from this source will be diminished in the future.

In the last report your directors expressed the opinion that they could, out of the then unliquidated assets, pay off the balance of your floating debt and also provide all necessary working capital. These expectations have been realized and in addition thereto the company has purchased and canceled $1,250,000 of its own debentures at an average cost of less than 89 per cent.

As a result of the decision in the "Bate case," recently announced by the Supreme Court of the United States, it is now settled that the fundamental patent upon the Edison incandescent lamp expired in November, 1894. Your company still own patents of more or less importance upon the incandescent lamp, but it will chiefly rely upon the high quality of the lamp manufactured by it and its facilities for manufacturing in large quantities at a low cost to maintain its commanding position in the lamp business irrespective of patent control. Lamp prices have necessarily been greatly reduced. While the volume of this important part of your business will without doubt be largely increased in the future, the percentage of profit thereon will necessarily be less than heretofore.

During the year the company has been successful in a number of suits in which it has been attacked by the owners of patents which it was charged with infringing. It has been defeated in no such suit. A valuable patent on the Edison form of socket has been sustained by a Court of Appeals. Several important suits on railway patents owned by the company are in progress, some of which will be argued this Spring.

The work done by the engineering department during the past year deserves special mention. Much has been accomplished in the development of large units, as well as in the perfection of the minor details of manufacture.

The only successful work yet accomplished in the operation of elevated roads by electricity has been done by your company, and it is now engaged in important installations of underground electric conduits for street railways.

In large power generators, in mining and power transmission work, in regulating and measuring devices and in railway motors, the development and perfection of design have been especially noticeable.

The selling organization has been conducted on an efficient and economical basis, and the sales made during the past year have been almost wholly on a cash basis; the average terms of payment on all sales being 40 days after shipment.

These companies contribute an important part of the business done by your company in central station lighting and distribution of power, and their growth and prosperity are closely identified with the welfare of your own company. The relations which have heretofore existed between these licensee companies and your company continue, and the policy of your company in the future, as in the past, will be to cultivate their business and co-operate in the development of such licensees.

At the last annual meeting the following vote was passed:

"*Resolved*, That the matter of reducing the capital stock of the company in the manner prescribed by law be referred to the incoming board of directors, with request that they give it attention; and, if such a course commends itself to them, that they call a special meeting of the stockholders for consideration and proper action."

Your board, after careful consideration, has deemed it inexpedient to take any action with reference thereto.

The indications are favorable for a volume of business in excess of that of last year; but prices are abnormally low and satisfactory results will largely depend upon the ability of your company still further to reduce the cost of production and distribution of its manufactures.

In closing this report, the president and directors desire to express their thanks for the good work done by the officers and employés of the company in their efficient administration of the various departments.

NEW YORK SELECTED

AS THE MEETING PLACE FOR THE NEXT CONVENTION OF THE NATIONAL ELECTRIC LIGHT ASSOCIATION—THE EXACT DATE AND THE EXHIBITION QUESTION LEFT TO A SUB-COMMITTEE.

Every officer and member of the executive committee of the National Electric Light Association responded to President Wilmerding's call and was present at the meeting of the executive committee last Saturday evening at the Grand Central Palace, Lexington avenue and Forty-third street, New York city. As the meeting was called to decide the important questions of the selection of the next convention city and the advisability of holding an electrical exhibition, the committee invited a number of guests to be present. The list of those in attendance follows:

President C. H. Wilmerding, of Chicago; First Vice-President Frederic Nicholls, of Toronto; Second Vice-President E. F. Peck, of Brooklyn; Secretary and Treasurer Geo. F. Porter, of New York; Master of Transportation C. O. Baker, Jr., of New York; Executive Committeemen John A. Seely, of New York; E. H. Davis, of Williamsport, Pa.; A. J. De Camp, of Philadelphia; Charles R. Huntley, of Buffalo; A. Markle, of Hazelton, Pa.; W. W. Carnes, of Pittsfield, Mass.; W. R. Gardener, of Pittsfield, Mass.; G. A. Redman, of Rochester, N. Y., and J. J. Burleigh, of Camden, N. J. The guests were: R. B. Corey, H. H. Harrison, Marcus Nathan, of New York; T. C. Martin, of the *Electrical Engineer*; W. F. Osborne, of the *Western Electrician*; B. E. Greene and John L. Gans, of *Electricity*; W. D. Weaver, of the *Electrical World*; Stephen L. Coles, of the ELECTRICAL REVIEW.

Mr. L. R. Mestaniz, of the Grand Central Palace, had provided a room on the fifth floor, in which a sumptuous dinner was served by Caterer Baermann. It took some time to dispose of the toothsome viands. After dinner President Wilmerding called the meeting to order and suggested that provision should be made for extending the term of office of the president beyond the year for which he was elected, as the next meeting of the association will not occur until June, 1896. Considerable discussion on this point ensued. It was finally decided that the by-laws provided for the matter, and that in any event the president would hold over until the appointment of his successor.

Mr. Seely moved that the next meeting of the association be held in New York city in May, 1896, the exact date to be fixed later. In seconding the motion Mr. Huntley argued against the association jumping about the country to hold its conventions, and suggested that the meetings be held in New York and Chicago in alternate years. Mr. Seely's motion was carried.

Mr. Seely then spoke in favor of holding an electrical exhibition in the Grand Central Palace during the next convention. He said that he was one of a number of gentlemen who would be willing to run the affair, assume all responsibility and guarantee 25 per cent of the net receipts to the association if it would allow the exhibition to be held under its auspices and did not desire to assume the financial responsibilities involved. Mr. Huntley advised careful consideration of the subject. Mr. De Camp did not believe that central station men would be attracted by such an exhibition. He spoke in favor of the association cutting loose entirely from the manufacturing companies and devoting itself solely to considering questions of central station operation and economy. More discussion at considerable length followed until Mr. Nicholls moved that the consideration of the exhibition question in detail and the exact date for holding the next convention be left to a sub-committee consisting of Messrs. Huntley, chairman, Seely, De Camp, and the president, vice-presidents and secretary *ex-officio*. The motion was carried. Mr. Nicholls moved a vote of thanks to the electrical press for its interest in and devotion to the association. The motion was seconded and in calling for a vote President Wilmerding made some very kind remarks after which the motion was carried.

After a casual inspection of the immense and well appointed building the electrical men went home, the majority of them feeling that a movement of great importance and benefit to the National Electric Light Association had been auspiciously inaugurated.

It is reported that the plant of the Hackensack, N. J., Edison Lighting Company was sold last week for $24,000 to the local gas company.

THE ADAMS-BAGNALL ELECTRIC COMPANY.

PERSONNEL OF THE NEW CLEVELAND CONCERN.

In the ELECTRICAL REVIEW for April 24, 1895, announcement was made of the formation of the Adams-Bagnall Electric Company, at Cleveland, Ohio, by a number of gentlemen who had been connected with the Brush Electric Company. Who these gentlemen are and some things they have done is told below.

The officers of the company recently elected are as follows: Charles G. Hickox, president; George W. Howe, vice-president and treasurer; L. H. Rogers, manager; S. E. Cox, secretary; C. W. Phipps, superintendent. They have leased the factory No. 47 East Prospect street, Cleveland, built for a manual training school and formerly occupied by the Hackney Bicycle Company, and were ready for receipt of quotations on supplies for the equipment of their factory and the manufacture of goods on May 1. The company is organized under the laws of the State of Ohio with a capital stock of $150,000.

The man whose name heads the new company, Mr. Thomas E. Adams, was with the Brush company a great many years. He is what is termed a practical inventor; that is, an invention to him is not an invention unless the new idea puts in concrete form some decidedly advantageous or meritorious point in the device, which must, in his estimation, be accompanied by a reduced cost of manufacture. Mr. Adams always studies the practical side of the device upon which he is at work. The famous Brush-Adams arc lamp, for instance, is said to be the sole production of Mr. Adams. It has very many points of merit which were obtained from an extended investigation from the practical side. He interviewed and talked with a great many trimmers, who gave him ideas as to what was needful in an arc lamp during all kinds of weather and in all seasons. He then proceeded to obviate the difficulties actually encountered by these men. The success which that lamp has met with in the market tells how well he has done his work. Mr. Adams is one of the incorporators of the new company, and severed his connection with the Brush Electric Company on April 9, 1895. What Mr. Adams will produce for the Adams-Bagnall Electric Company in the shape of an arc lamp cannot be told at this writing, but the simple announcement of the fact that in the course of the next few months T. E. Adams will bring out a new arc lamp will be received with interest.

Mr. E. J. Bagnall was with the Brush Electric Company for eight years or more, and when there, occupied a number of prominent positions, passing through all the practical branches of the factory. For the last seven years he has been in St. Louis building and operating electric light plants and stations with entire and thorough success. He was one of the founders of the St. Louis Engineering Company and consulting engineer for the Lindell Railway Company, which road he built and equipped with electric power. Mr. Bagnall has been called back to the Brush company and retained by them several times as an expert in the development of railway systems and on other matters. The incorporation of these two names, Adams and Bagnall, will result in the production, literally, of "A-B." apparatus in simplicity as well as in name.

The other men who are associated with this combination and who resigned from the Brush Electric Company on April 9, are: L. H. Rogers, assistant general manager Brush Electric Company and general manager of the Sperry Electric Railway Company; C. W. Phipps, Superintendent of the Brush Electric Company; S. E. Cox, secretary and practical manager of the Swan Incandescent Lamp Manufacturing Company; George Arnold, head of the drafting department of the Brush Electric Company.

Mr. L. H. Rogers is widely known over the United States. He has been with the Brush and General Electric companies for the past six years and has been successful in being able to dispose of a great many goods.

Mr. C. W. Phipps has been with the Brush Electric Company almost from its incorporation. He was sent to Europe in their interests, when the Anglo-American Brush Electric Company, of London, England, purchased their European patents. Mr. Phipps was also sent to Japan by the Brush company when they started the development of electrical industry in that country. He has had a very wide experience in the electrical field, especially in the construction and operation of electric plants, and latterly in the superintendence of the large factories of the Brush company. For a great many years Mr. Phipps has had a large force of men under his supervision, which experience is very valuable.

Mr. S. E. Cox has for a number of years been in the incandescent lamp department of the Brush Electric Company. This company has been a separate organization under the name of the Swan Incandescent Lamp Manufacturing Company, which has always been managed in connection with the Brush company. Mr. Cox has proven himself a valuable manager in this department for the Brush company.

Mr. George Arnold has also been connected with the Brush Electric Company for a great many years and has held various positions of responsibility. His last connection has been at the head of the drafting department. He has been of very valuable assistance in the development of the large arc dynamos now being built by the Brush company.

Associated with the above-named men are quite a number of the best known capitalists in the city of Cleveland, Ohio. Mr. Charles G. Hickox and Mr. George W. Howe, two capitalists of Cleveland and business men of very high standing, have associated themselves largely with the above-named practical men and are taking an active and lively interest in the development of the company.

All of the above-named men, who have gone out from the Brush Electric Company, are so widely and favorably known in electrical circles that the development of their new enterprise will be watched with a great deal of interest.

Regarding the output of the company, nothing definite can be officially stated at this time. It is positively known, however, that they will make arc lamps, incandescent lamps and, possibly, railway motors. They claim, however, to reserve the right to manufacture anything in the electrical line in which they can clearly see a profit. The electrical fraternity will await with considerable interest for cuts and descriptions of their arc and incandescent lamps, which they promise to have on the market within a few months' time.

OUR BOSTON LETTER.

ELECTRICAL NEWS OF THE HUB—SATURDAY HALF-HOLIDAY ARRANGEMENT—TRADE AND SOCIAL HAPPENINGS.

The New Haven Car Register Company, of New Haven, Conn., report business in their line excellent, and for some time past their plant has been taxed to its utmost capacity to keep up with orders. The registers of this company are now in use in almost every town of any size in New England, and are giving entire satisfaction. Among the large street railway companies who have recently placed orders are the Baltimore Traction Company, the Philadelphia Traction Company, the New Jersey Electric Railway Company and many others. The double and triple registers which were put on the market a short time ago, and which were exhibited at the Atlanta Convention, have met with a ready sale, and numbers of them are now in use.

The leading supply houses of Boston, including the Pettingell-Andrews Company, Holtzer-Cabot Electric Company, Anchor Electric Company, Ziegler Electric Company, Thomson-Brown Electric Company, the Electric Gas Lighting Company and Gillis & Gleason have come to an agreement by which their places of business will close at 1 P. M. on Saturday and 5 P.M. on week days during the months of May, June, July, August and September.

Forbes & Glidden is the title of a new electrical and chemical engineering firm who have opened offices in the Hathaway Building, 620 Atlantic avenue, Boston. These gentlemen have been for some time connected with the firm of Stone & Webster, of this city. Aside from their business of designing and supervising electrical installations, they will make official tests of electrical and other apparatus.

The suburban mail service on the West End road was inaugurated May 1, and six routes have been laid out as a starter, covering the most important points. These routes are numbered from one to six consecutively and are as follows: Route 1 is between the Central Office, Back Bay, Brookline and Brighton, and there will be seven trips each way daily between the hours of 5 A. M. and 9.40 P. M. Route 2 covers the South End and Roxbury offices, and seven trips each way will be made on this line also. The first car leaves the post office at 5.45 A. M., and the last one reaches there at 4.58 P. M. Route 3 takes in the Cambridgeport, Cambridge and North Cambridge offices, and the seven round trips cover the time from 5.45 A. M. to 7.10 P. M. Route 4 embraces the East Cambridge and Somerville Post Offices, and on this route eight trips each way will be made between 5.45 A. M. and 7.20 P. M. Route 5 covers the South Boston and Dorchester districts and six trips each way will be made. Route 6 is between the Dorchester Post Office and the Roxbury, South End, Back Bay, Cambridgeport, Cambridge and North Cambridge offices, and on this line only three trips each way will be made. The cars are some of the short 16-foot ones, formerly used as horse cars, which have been altered and fitted up for this purpose. They are equipped with every facility for the quick handling of mail, and each car will have a force of three men. They are painted white, with "U. S. Mail" in bright gold letters conspicuously displayed and make quite an attractive appearance. It is believed that they will very materially improve the mail service, and that the present outfit is only the beginning of an extensive system.

On April 29 the selectmen of Bridgewater gave a hearing at the town hall on the application of the directors of the Brockton & Bridgewater and Brockton & East Bridgewater electric railway companies for authority to lay tracks, erect poles and string wires within certain streets of the town. The petitioners were represented by General Manager Harrison A. Rogers, of the Brockton Street Railway Company. Mr. Rogers stated that the company desired to build its tracks from the terminus of the Brockton road in Campello, and thence through West Bridgewater to Central Square, Bridgewater. The Brockton & East Bridgewater company proposes to build its tracks from East Bridgewater to the same point as the Brockton & Bridgewater company. The selectmen decided to grant the application, and parties interested in the building of these roads say that the money for the same has been subscribed and that work will be commenced at once and cars running early in the Fall.

The Brattleboro Street Railway Company, of Brattleboro, Vt., has contracted with M. A. Cooledge, of Fitchburg, to build the electric road in that village and to West Brattleboro. The contract calls for the completion of the road by June 15. Work will be begun about May 10. The building of the road has been fought by some of the leading men of the town, and it is probable that an injunction will be sought from the courts by the opponents of the road.

The first annual meeting and dinner of the "Electric Potential" was held at Young's Hotel on the evening of April 30, and proved to be one of the best attended and most enjoyable gatherings since the organization of the club. After dinner a very able paper on "Alternating Currents" was read, followed by a general discussion of the subject by the members. Officers were elected for the ensuing year and the meeting adjourned subject to the call of the chair. Interest in the society itself and the object for which it was formed is steadily increasing and the prospects for a much larger membership in the Fall are very promising. H. G. T.

Boston, May 4.

Electrically Lighted Signs.

One of the comparatively recent developments of the use of electric lights are the electric signs which stand out boldly in letters of fire and form a prominent feature of the city's illumination after dark, says the New York *Evening Sun*. Most of the signs now in use are in front of theatres, some of them are changed with each change of programme, while others, displaying the name of the theater itself, are permanent. Many hotels also have these signs, and their use is spreading so rapidly that their manufacturers have hard work to keep up with their orders.

The first electric sign for a theater was built in Detroit in 1888 by Edwin Miner, son of Congressman H. C. Miner, the theatrical manager. It was made for the Grand Theater, and consisted of a big board, on which the letters were painted. The lights shone through holes cut in the letters. It bore the words "Grand Theater."

After this experiment, although it was a success, nothing further was done to develop the idea until the early part of last year, when a large sign was erected in front of the Fifth Avenue Theater to advertise the comic opera "Mikado," a current attraction.

After that there was a rush for the signs on the part of the managers of New York theaters. The fire underwriters at first looked upon the innovation with a suspicious eye, but after subjecting one of the signs to an exceptionally severe test, which it stood triumphantly, offered no objection to their use.

It was apprehended that it would be difficult to insulate so many incandescent lamps, placed out-of-doors in such a way that the current wouldn't leak in case of rain or snow. There was no trouble reported with any of the signs, however, at any time last Winter, although on several occasions the letters were filled with snow and sleet.

The letters most used in signs are 25 inches high. They are five lamps high and are four lamps broad; that is, five incandescent lamps are ranged one above the other to make the vertical lines of the letters, and four incandescent lamps in a row form the horizontal lines.

The lamps used are ordinary incandescent lamps of 16 candle-power. For exceptionally large signs 32-candle-power lamps are used and for small signs lamps of eight candle-power have been employed. Besides the 25-inch letters, the sizes that are most used are letters three feet high. Eighteen-inch letters are also frequently used. The largest letter that has yet been made is nine feet high. It was made to order for a hotel in Brooklyn.

Each of the letters of the signs has what is called an individual cut-out. In case of any accident to one of the letters the current may be turned off from that letter without disturbing any of the others in the sign. The life of an ordinary incandescent lamp is from 800 to 1,200 hours, although some of them burn a great deal longer before giving out. Since, on an average, the lights are only burned for three or four hours a night, a sign might be used for a year before it becomes necessary to replace the lights.

The letters of the signs are so constructed that they answer all the purposes of an ordinary sign in the daytime, when the current is turned off from the lamps. They are waterproof, and by means of an ingenious device, in case any moisture should penetrate the letters while the current is turned on, the letter is short circuited and its lights go out.

A number of changeable electric signs have been erected in New York. They may be rented for $1 a week per letter, and the letters and words may be changed at will. In the case of permanent signs the letters are sold outright for prices varying from $8 each for 18-inch letters to $15 for three-foot letters.

A new development of the electric sign consists of a revolving cylinder seven feet in diameter, containing 10 signs, each with letters three feet high. The cylinder revolves automatically, and each of the signs is placed in turn in a large ornamental frame, when the current is turned on automatically and the sign is illuminated until the cylinder revolves another notch and throws another sign into the frame.

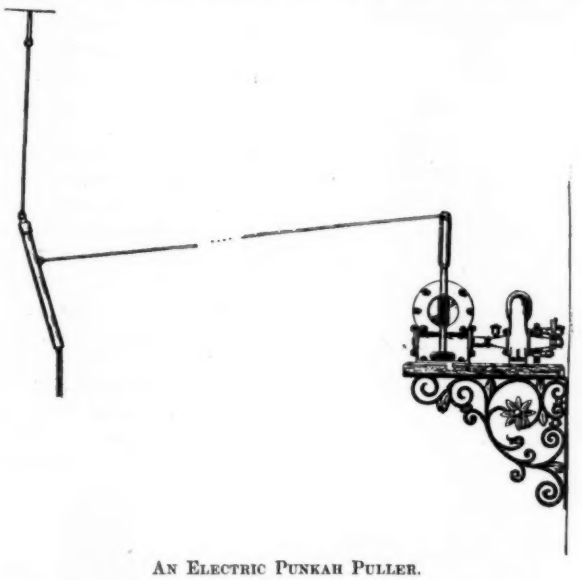
This apparatus is intended to be placed in prominent positions, where it may be seen from crowded streets. It may be erected, for instance, on a flat roof, after the manner of the stereopticon advertising signs.

Another invention is an automatic apparatus by which an electrical current may be turned into one letter after another of a sign until all the letters are illuminated. Then all go out at once, and the spelling-out process in letters of fire is repeated.

Prof. Thomas M. Drown, M.D., now occupying the chair of chemistry at the Massachusetts Institute of Technology, has been elected to the presidency of Lehigh University. Professor Drown is eminently qualified in every way for his new position, and all old "Tech." men will be glad to hear of his advancement.

An Electric Punkah Puller.

The conservatism of the East is the motive of more than one of Rudyard Kipling's charming tales, says a writer in London *Lightning*, and, like a belief in magic and several other oriental peculiarities, it not unfrequently lays hold of the European who is long resident there, while by sheer *vis inertiæ* it breaks down the efforts of those who go out under the impression that they can introduce improvements. I have been told more than once by old residents in India that no mechanical contrivance can take the place of the punkah wallah, notwithstanding his annoying habit of dropping work as soon as he thinks you are asleep, and I can imagine the disdain with which the electric fan, considered so great a luxury in America, would be received at an Indian station by those accustomed to the rhythmic beat of the punkah. The more credit is due to Messrs. Scott and Mountain for their endeavor to deal with this problem without inflicting too great a shock on the conservative instincts of their eastern public. They claim that the "punkah puller," illustrated herewith, imitates almost exactly the quick pull and slow return of the punkah wallah. It is actuated by a small electric motor driving a worm that gears into a worm wheel, which causes a lever, working on a fulcrum that can be placed out of center, to oscillate backward and forward in the manner indicated. The power expended is about equal to that in three 16-candle-power incandescent lamps.



An Electric Punkah Puller.

PERSONAL.

It is stated that H. McK. Twombly and D. O. Mills will undoubtedly retire as directors of the General Electric Company.

A. D. Richmond has been chosen general superintendent of the Consolidated Light and Power Company at Dover, N. H., and has assumed charge.

Mr. Frank Phillips, son of Mr. Eugene F. Phillips, of Providence, and his mother sail for Europe the first of next month and will spend the Summer on the Continent.

Duke John I. Sabin, who owns the telephone business of the Pacific Ocean, with headquarters at San Francisco, is due in the East on May 14. This notice is given in advance so persons interested will have time to escape.

Mr. William Hazelton, 3d, has been appointed American manager, with offices in the Havemeyer Building, New York, for the Arbel establishments, manufacturers of wrought iron forged wheels for locomotive railway and tramway service, whose works are at Rive De Gier (Loire), France.

Mr. Frank S. Marr, of the Helios Electric Company, Philadelphia, was a welcomed visitor in New York last week and paid the REVIEW a pleasant call. The business of the Helios company is rapidly increasing, and Mr. Marr is naturally highly pleased with this fact and also that the "Helios" arc lamp is so universally popular.

Mr. Cyrus O. Baker, Jr., who is at the head of the large platinum refining house of Baker & Company, New York and Newark, sails on "La Gascogne" May 25 for Paris, and will spend several weeks abroad in the interest of his company. Mr. Baker will probably visit Russia before he returns. Dr. Chas. H. Parkhurst, the eminent reformer of New York city, visits Russia at the same time.

Mr. John King having resigned as receiver of the New York, Lake Erie & Western Railroad Company, Mr. E. B. Thomas has been appointed receiver in his place by an order of the United States Circuit Court, dated April 26, 1895. On and after May 1, 1895, the business of the company, and all its auxiliary companies, will be conducted by J. G. McCullough and E. B. Thomas as receivers.

Mr. Edward Wells, Jr., and Lieut. Avery D. Andrews have removed their law offices from 111 Broadway to 97–103 Cedar street, New York, the new building of the Fidelity and Casualty Company. Lieutenant Andrews, who is Police Commissioner of New York city, has many friends in the electrical field who will be pleased to learn of his success since retiring from the army, not only in law but in official life.

Mr. F. C. Mason, superintendent of police telegraph of Brooklyn, N.Y., widely known in electrical circles, leaves for Glasgow May 25 and will spend several weeks visiting the scenes of interest in Great Britain and France. Captain Mason carries official letters of introduction from Police Superintendent Byrnes, of New York, and Police Superintendent McKelvey, of Brooklyn, and will make a thorough investigation of police matters in London and Paris, particularly as relating to the telegraph departments.

Mr. Henry W. Slocum has resigned the presidency of the Coney Island and Brooklyn Railroad Company, of Brooklyn, N. Y. It has been accepted, but Mr. Slocum may hold on until July. The only reason he gives is need of more leisure. Mr. Slocum's road was the only one that did not go on strike in the recent big tie-up. He is wealthy, and succeeded his father, Gen. Slocum, in the presidency. He is well known in Brooklyn financial and social circles. At one time he was the champion tennis player of the United States.

TELEPHONE NEWS AND COMMENT.

The Texas Legislature has adjourned without passing any legislation affecting telephone interests.

Prof. Alexander Graham Bell and his wife visited Little Rock, Ark., recently on a return from a five weeks' visit to Mexico.

It is reported that the Ohio Telephone Exchange Company, organized at Columbus, O., on April 29, will cut the prices of the old companies in Ohio 50 per cent.

The Board of Electrical Control of New York city has given the Metropolitan Telegraph and Telephone Company permission to build a subway in Fifth avenue from Twelfth street to Twenty-third street.

"Telephone Exchange" is the title of a pocket-size hand-book by E. M. Harrison, M. D. and E. E., late chief electrician of the Harrison International Telephone Company. It contains considerable matter of interest to people new in the telephone business and may prove acceptable to some of the old-timers.

In spite of the fact that a majority of the Wisconsin Telephone Company's subscribers at Eau Claire and at Chippewa Falls expressed themselves in favor of a $36 rate and toll on the interurban line, and against the $40 rate and a free line, the telephone company has established the $40 rate and left the Chippewa line free.

The East Pittsburgh Telegraph and Electric Messenger Company is the corporation that is to give the Central District Telegraph and Printing Company the tussle for telephone patronage in Pittsburgh and vicinity. The company was chartered last August, and is said to be backed by Westinghouse and Philadelphia interests.

Superintendent John C. Reilly, of the New York and New Jersey Telephone Company, in an affidavit presented to Judge Osborne of the City Court, Brooklyn, N. Y., last week asked for an injunction restraining the City Works Department from interfering with their work of laying wires in the street. Mr. Reilly alleged that since the aldermen granted a franchise to an opposition company his company has been unable to get permits and that their workmen have been prevented from laying telephone wires. Judge Osborne issued the injunction in a permanent form.

The directors of the Erie Telegraph and Telephone Company have declared the regular quarterly dividend of one per cent, payable May 20 to stock of record May 11. The annual meeting of the company takes place in New York, June 11, and books for both the dividend and annual meeting will be closed from May 11 to June 12. Gross earnings for the quarter ending March 31 increased over $11,000 compared with last year, and there was a net gain of 249 subscribers. The expense account, says the Boston *News Bureau*, is made up on the same basis as previous quarters, not taking into consideration the concession of $18,000 made by the American Bell Telephone Company in royalties, the amount of the concession having been credited to reserve account.

A New Grease Cup.

We illustrate herewith a new grease cup, which has recently been placed on the market by the Penberthy Injector Company, of Detroit, Mich., manufacturers of the famous "Penberthy" automatic injector. The name of this company is sufficient guarantee as to the quality of any new article which they may put on the market, but the grease cup in question has also many points of superiority claimed for it.

First and foremost the body is a glass cylinder, surrounded and protected by an outer brass shell with openings on four sides, through which the user can tell at a glance the amount of grease or "dope" in the cup and know when to refill it, so that the journal where it is used never need be dry, unless through carelessness. The plunger, by which the grease is forced out from the bottom of the cup, is made of a heavy rubber washer, protected on both sides by a brass disk, the whole being attached to the bottom of the stem in such a manner that the stem revolves without turning the washer or disks, and at the same time no grease can pass up through the center of the washer. The cover never needs to be removed from the cup, as the body of the cup is screwed on to the shank and is removed from the shank to be refilled; therefore, there is no chance for any of the parts to be lost or mislaid when the cup is being filled. This cup is meeting with a very rapid sale, and while only placed on the market the first of January and advertised scarcely any since that time, yet the manufacturers say they have been unable to keep up with their orders and are somewhat behind, even at the present time, although they started with a fair stock. Circular and price list of this cup will be sent on application to the above company.

A New Grease Cup.

Special Decorative Incandescent Lamps.

The Columbia Incandescent Lamp Company, of St. Louis, Mo., are placing on the market some special incandescent lamps very suitable for decorative purposes. Fig. 1 represents the full size 16 candle-power coiled filament round bulb incandescent lamp, which is made in high voltages and is very suitable for window and ceiling decorations. The lamps are capable of being used in a horizontal position without any dropping of the filament. They maintain their candle-power to the high degree of the new type Columbia incandescent lamps in high economy and give a very pretty effect, either clear or in ground glass. Fig. 2 represents a special candelabra lamp, which is suitable for burning in series on 100-volt circuits and upwards. These lamps, used with small yellow and red silk shades, make a very pretty and harmonious effect.

Fig. 1.—Columbia Round Bulb Lamp.

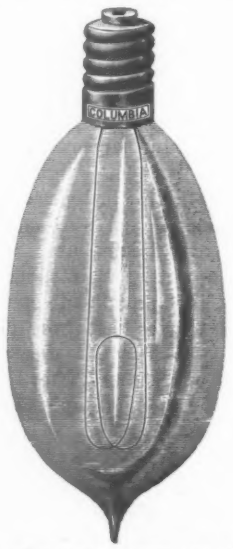


Fig. 2.—Columbia Candelabra Lamp.

The Paris, Me., Electric Company is reported to have completed arrangements with the American Bell Telephone Company and the New England Telephone and Telegraph Company, whereby its Buckfield and Paris Hill telephone line is to have direct connection with the entire New England telephone system.

EFFECTIVE ELECTRIC LIGHTING.

BY W. PERREN MAYCOCK, M.I.E.E., IN LONDON "ELECTRICAL ENGINEER."

(Concluded from page 230.)

Another lamp adapted for reflected lighting is shown in Fig. 5, and is made by Messrs. H. J. Joel & Company, of 31 Wilson street, Finsbury, E. C. As will be seen the lamp is placed horizontally on an ornamental iron wall bracket, and the light may either be thrown ceilingwards by means of a reflector, or the lamp may be placed above the ceiling and the light allowed to shine through an opal or frosted glass ceiling light or skylight, the effect being very soft and pleasing. In the case of show-rooms, picture galleries, or shops with low ceilings, the plan of placing the lamp above the ceiling will be found very good, much more room being thereby saved. We can imagine that in the case of a public hall or large room, with these lamps ranged around the walls, and the light thrown up to the ceiling, especially if the latter had sloping sides, the effect would be very good.

When lamps of the pattern shown in Fig. 4 were used for other than workshop or factory lighting—*e. g.* in concert halls, assembly rooms, shops, etc.—the underside of the shade and the case containing the lamp mechanism could be concealed by some floral design in wrought metal-work, and the lamps would then look very ornamental.

When the ceiling is too high to reflect the light with advantage, a large umbrella-like shade is placed above the lamp, by which means the light is reflected downwards. In this case, however, the diffusion of the light would not be so perfect.

Although we are not aware that inverted arc lighting has yet been applied to domestic work, we see no reason against its adoption, as there are many patterns of small-current arc lamps on the market which will work two in series of 100-volt mains. There should be no difficulty in adapting one or other of these patterns to inverted work, or a smaller size of the particular make of lamp shown in Fig. 4 might be turned out. The low white ceilings of the generality of houses would lend themselves admirably to such a method of illumination, and we confidently look forward to this as a future departure in domestic interior lighting.

While on the subject of arc lighting, a few remarks on the ordinary use of arc lamps will not be out of place. The usual plan is to enclose the arc in a globe or lantern made of opal or ground glass. The former material absorbs from 50 to 60 per cent of the light, while ground glass, according to its density, absorbs from 30 to 50 per cent. It will at once be seen how extremely wasteful is the usual method of dispersing or attempting to disperse the light rays. It is really only necessary to disperse the downward rays; the upward ones should be unobstructed, and then thrown down by a reflector. A lamp fulfilling these conditions, and made by Messrs. Joel & Company, of Wilson street, Finsbury, is shown in Fig. 6. Here it will be observed that the bottom half only of the globe is opal, the top half being of clear glass, the opal hood serving to reflect the upward rays downwards. This form of lamp is a great deal superior to ordinary forms used in street illumination. In fact, the usual practice of outdoor arc lighting is very crude and unscientific. In spite of the globes, the lamps have a dazzling effect on the eyes if looked at for a few seconds, and sharp shadows are thrown, two

things to be especially avoided in outdoor lighting. The lamps are put at a height of 18 or 20 feet in order that the light may be cast over a large area, and also that they shall not easily catch the eye. Much light is lost by placing the light so far above the ground, the

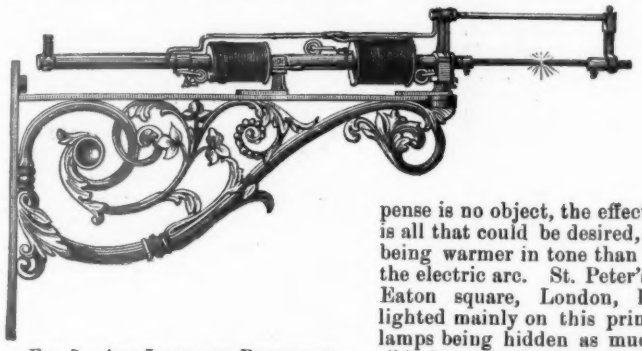


FIG. 5.—ARC LAMP FOR REFLECTED LIGHTING.

height being also necessitated by the distance apart at which the lamps are placed. It is here suggested that more effective street illumination would be obtained by using lower candle-power lamps, placing them proportionally nearer together, at, say, the height of an ordinary gas lamp, using hoods of the pattern shown in Fig. 6, and making the bottom half of the globe semi opaque, while, of course, retaining the interior reflecting surface; care being taken

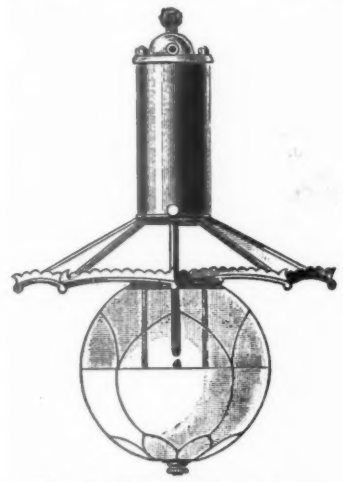


FIG. 6.—HOOD FOR ARC LAMP.

in the case of a direct-current system to have the positive or crater carbon at the bottom. The bottom half of the globe might be tinted a deep orange color, which would give a very pleasing effect without glare.

Experiments have been made by Mr. A. T. Trotter in England, MM. André Blondel and Psaroudaki on the Continent, with clear glass globes and shades having prismatic corrugations on their surfaces, called variously dioptric or holoplane shades. These experiments have been entirely successful in obtaining a good diffusion of the light with little absorption, but difficulties of manufacture, added to the dirt-harboring propensities of the corrugated surfaces, have done much to retard their adoption. However, the holoplane shades and globes of the two continental inventors, which differ in many respects from the devices of Mr. Trotter, are now being manufactured by Messrs. Englefred & Company, of Paris, and are being so well taken up on the Continent that it is very likely they will soon find their way into this country. These are made for both arc, incandescent and other lights, and should find special favor for interior illumination, where they are not so liable to become dirty.

Let us now return to the consideration of incandescent lamp illumination, which has already been referred to at some length. Owing to the much less intensity and higher cost of the incandescent light, as compared with the arc light, the lighting of interiors, with reflected light from hidden lamps, is necessarily rather an expensive matter. But, where expense is no object, the effect obtained is all that could be desired, the light being warmer in tone than that from the electric arc. St. Peter's Church, Eaton square, London, has been lighted mainly on this principle, the lamps being hidden as much as possible from the direct view of the congregation. In this instance two hundred and sixty 16 candle-power incandescent lamps replaced no less than 640 gas jets. Freemasons' Hall, London, is lit by shaded incandescent lamps arranged around the frieze and on the ceiling.

It is only in rooms where the decoration of the ceiling and walls is in light colors that illumination by reflected light can be carried out, unless, of course, an unusual number of lamps are used, dull surfaces absorbing a considerable percentage of the light. In such cases the light should be thrown direct from the lamps through their shades. With a given method of shading the lights and a given size of room, the number of lamps required to give efficient illumination will depend upon the nature and color of the surroundings; thus a dark wainscoted room would require more lamps than one with ordinary wall paper and a whitewashed ceiling.

An excellent effect for any kind of room is given by the use of electric candle lamps, provided with suitable silk or paper shades. The flutings on the lamp bulb give a flame-like appearance to the light when viewed from a distance, so that the dazzling effect is lessened; but still the shades should be arranged well over the lamps, so that the latter are seen as little as possible.

The majority of fittings, both electroliers and brackets, are arranged for the lamp to be hung downwards. This is a great mistake, as the shades offer little or no protection for the eyes. In some cases this difficulty is overcome by putting on a second shade under the lamp, so that an

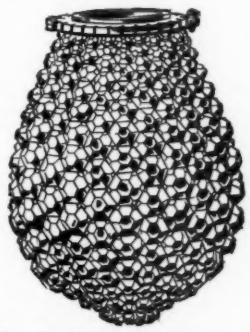


FIG. 7.—BEAD RAY DIFFUSER.

unnecessary amount of light is absorbed. Most of the usual forms of wall brackets would answer much better if they were put upside down; the downward rays would then be more or less dispersed, while the upward ones would be quite unimpeded; care being taken to place the brackets at such a height that the top of the lamps were just visible when standing on tiptoe.

When downward hanging lamps are preferred, the lamps should either be shaded, or the bulb of the lamp should be frosted or treated with some composition which will prevent the filament itself from being seen. Of such shades there are numberless varieties, good, bad and indifferent. Opal and ground glass shades as a rule absorb too much of the light, while plain or colored transparent shades will permit the filament to be seen and will not disperse the light. Cut and etched glass shades best fulfill the required conditions. Fig. 7 illustrates the bead ray diffuser, the shade being built up of crystal or tinted cut-glass beads. If downward hanging lamps must be used, and the cost of shades cannot be incurred, the globes of the lamps themselves should not be plain. Most makers supply lamps with frosted globes, and Messrs. Slade, Templeton & Co., of 15 New Broad street, London, supply lamps with etched globes. Ordinary lamps can be treated with various compositions. The Luminous Enamel Syndicate, of 37 Cursitor street, Chancery lane, E. C., make a luminous enamel, which, when applied to the lamps, entirely hides the filament, at the same time dispersing the light very effectively. This enamel is made in various colors, but the white is to be preferred for general purposes. Another composition, called "Snowflake," is made by

FIG. 8.—HALL LAMP.

Messrs. V. Fabris & Company, of 171 Drummond street, Hampstead road, London, N. W. Yet another is "Shaydolite," supplied by Messrs. Griffiths Brothers & Company, of Mack's road, Bermondsey, S. E. This latter is of the nature of a varnish, and is made in various colors. "Shaydolite" being transparent, does not diffuse the light to any great extent, and does not hide the filament, but it is much used for theatrical and similar purposes where colored lamps are a feature of the decorations. The advantage of these compositions is that they may be applied to the whole or part of the lamps. According to the position of the latter with regard to the eyes, it is well to treat only those portions through which the filament would otherwise be seen, leaving the rest untouched, thus impeding as little as possible of the light.

In selecting fittings, the guiding principle is thus to have only those in which the filament of the lamp is shaded from the eyes, but exposed on those parts not directly in view. Fig. 8, for example, shows a rational form of hall lamp. The lamp is entirely shaded from view, so that no direct rays can be seen. It may be said that the top shade is rather unnecessary, but then it must be remembered the light has to be screened from persons descending the stairs, as well as from those on the floor. Fig. 9 (which, as well as Fig. 8, has been lent by the General Electric Company) illustrates a table pendant

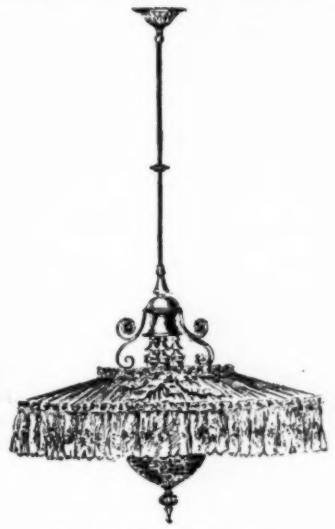


FIG. 9.—TABLE PENDANT.

lamp with cut-glass bowl, which serves to prevent the direct rays from the filament to some extent from striking the eyes. In fittings provided with bowls, like Figs. 8 and 9, a most pretty and artistic effect can be obtained by arranging natural flowers in the bowls, the flowers and leaves serving to obstruct the direct rays from the filament. Many forms of wall brackets are designed on this principle.

In Figs. 1, 2 and 3 are illustrated various forms of fittings which are specially adapted for shop window or showroom lighting. A great deal might be said of this special branch of lighting, were space available. A walk down Oxford street, for instance, at night time will reveal the deplorable fact that in many cases the light has been unskillfully arranged, not always on the score of economy, as evidenced by the style of the fittings, but through sheer ignorance of what constitutes effective electric lighting. On the other hand, there are some installations that have been very well carried out, and which may be studied with advantage by those who contemplate undertaking similar work.

Enameled iron shades or reflectors are a good deal used in some installations, and their efficiency depends much upon their shape. Fig. 10 gives a section of a shade made by Messrs. Verity & Sons, of King street, Covent Garden, W. C. The figure shows by means of arrows the directions in which the rays from the

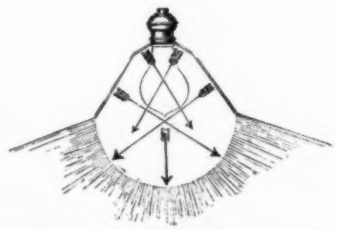


FIG. 10.—SECTIONAL VIEW OF SHADE.

lamp are reflected, and it will be seen that a good spreading out of the light is obtained.

In concluding this series of articles it is hoped that the main points which must be attended to if artificial lighting is to be a success, have been sufficiently impressed upon the reader. Much more might have been written on this subject, but all would have tended to the same end, which may be summed up in two words—reflection and diffusion.

ADVANCE INFORMATION.

VALUABLE INFORMATION FOR MANUFACTURERS AND DEALERS.

We publish below the earliest information obtainable relating to new electric railways, new electric light companies, new telephone companies and projected electric construction of all kinds. Every reader will find these columns of special interest, and manufacturers and supply houses will receive many valuable suggestions looking to new business by carefully watching this department in the ELECTRICAL REVIEW from week to week.

New Electric Railways.

CHICAGO, ILL.—A company has been organized, with a capital of $5,000,000, to build an electric railroad with underground conduit on Indiana avenue.

MISSISSIPPI CITY, MISS.—The Pass Christian, Mississippi City, Handsboro and Biloxi Electric Railway Company has been organized with L. B. Mosely, president, and L. Dinkins, vice-president, to build an electric road from Pass Christian to Biloxi, Miss.

OCEAN VIEW, VA.—An electric railroad is to be built at a cost of $250,000.

PORTSMOUTH, VA.—An electric railway is to be constructed from Portsmouth to Port Norfolk.

CARTHAGE, N. Y.—Steps are being taken to build an electric road from this city to Copenhagen, at a cost not exceeding $100,000.

DARBY, PA.—A charter has been granted the Collingdale Street Railway Company to run from Darby to Collingdale. Capital, $650,000.

MANCHESTER, N. H.—Soule, Dillingham & Company are pushing forward the work on the electric road. The street railway people have received the special work for Bridge and Manchester streets, and it is probable that the work will be commenced on Bridge street as soon as that point is reached on Elm.

NEW YORK, N. Y.—The Flushing and College Point Electric Railroad Company has been sold to Cravath & Houston, representing the reorganized company, for $25,000. The company will operate the road and will improve the property and give increased facilities.

MANCHESTER, N. H.—Work has commenced on the second track of the electric road. It will be finished as far south as Bridge street, and then the work will be transferred to that street.

NORTH HEMPSTEAD, N. Y.—An application for franchise to construct and operate an electric surface railroad, connecting the villages of Roslyn, Port Washington and Great Neck, will shortly be made to the joint board of town officers and highway commissioners of the town. Good men and plenty of capital behind the enterprise.

TOWANDA, PA.—The Towanda Traction Company have been granted an extension of time of three months in which to complete their road.

PIKESVILLE, MD.—The Pikesville, Reistertown and Emory Grove Electric Company expect to have their line completed about May 1 and open for business. W. D. MacQuesten is engineer.

NORFOLK, VA.—The Norfolk and Ocean View Electric Road. W. A. Young, H. L. Page and H. L. Smith are interested in having the road extended to Willoughby Spit, opposite Old Point Comfort.

ATLANTA, GA.—R. D. Fisher and others desire a franchise to build an electric line on Butler street, Forest avenue and connecting streets.

CHATTANOOGA, TENN.—D. M. Stewart, president of the company, which proposes to build an electric line from Rossville to the Chickamauga Park, is negotiating with contractors to build the road.

WASHINGTON, D. C.—The Washington, Alexandria and Mount Vernon Electric Railway Company has asked permission to complete its line into Washington. The road is now in operation from Mount Vernon to North Alexandria.

MANCHESTER, N. H.—The contract for furnishing electricity for the new electric road stipulates that the fluid shall be ready to be turned on July 1.

BRATTLEBORO, VT.—The Brattleboro Street Railway Company's directors presented petitions to the board of bailiffs and to the board of selectmen asking for an extension of the route granted by the railroad commissioners.

CAMDEN, N. J.—Workmen are laying tracks for the Second and Third streets trolley line.

HOBOKEN, N. J.—The North Hudson County Railway Company will ask for franchise to operate their Washington street line by electricity. Outside of the elevated road and the line above Fourteenth street, the city of Hoboken has no trolley system.

ASBURY PARK, N. J.—Atlantic Coast Electric Railroad Company, incorporated by Lawrence Fell, Orange; Wm. H. Hurst, John J. Walsh, J. Henry Haggerty, New York. Capital stock, $1,000,000.

RED BANK, N. J.—New York, Red Bank and Asbury Park Electric Railway, incorporated by Ivan Prowattain, Philadelphia; Joseph W. Robinson, Red Bank; and others. Capital stock, $500,000.

RED BANK, N. J.—Atlantic Highlands, Red Bank and Long Branch Electric Railway Company, incorporated by David S. Arnott, Silas Dutcher, W. H. Hazard, S. S. Whitehouse, Benjamin Frick, Brooklyn; A. T. Allen, Hoboken; William T. Parker, Little Silver; William T. Corlies, Chas. B. Parsons, Arthur A. Patterson, Red Bank; Jas. Steen, Batontown. Capital stock, $500,000.

LAKE CHARLES, LA.—The Lake Charles Electric Railway Company, organized by Gustave A. Jahn, of New York, president; R. H. Nason, of Lake Charles, vice-president; William Stone, treasurer, and H. B. Milligan, secretary, for the purpose of building a line in Lake Charles. Capital stock, $100,000.

MONTPELIER, VT.—The City Council have contracted for lighting the streets the coming year on a basis of 52 arc lights for 300 nights for $4,000. William A. Lord has been appointed city attorney.

CHATEAUGAY, N. Y.—An electric railway will be built from the pulp mills to the depot.

WESTCHESTER, N. Y.—The Westchester and Williamsbridge Traction Company will operate a street surface electric road between West Chester and Williamsbridge. Capital, $60,000. Directors: G. P. Morgan, A. C. McDonnell, Charles F. Tracy, all of New York city.

NASHUA, N. H.—Work on the track of the electric railroad will be at once begun in Hudson.

New Telephone and Telegraph Companies.

NEW ORLEANS, LA.—An ordinance granting to A. T. Moss, G. R. Penrose, W. P. Richardson, J. W. Stone and their associates, etc., the right to construct a new telephone exchange has been introduced in the City Council.

NEW YORK, N. Y.—The United Electric Telephone Company has been incorporated by Norman C. Raff, Frank R. Gemmon, Henry C. Williamson, Albert L. Richardson, Charles P. Rowland, Henry A. Tobb and F. C. Toepleman, of New York city. Capital stock, $50,000.

GREENVILLE, ALA.—The Southern Telephone Construction Company, of Atlanta, Ga., will establish a telephone exchange.

MIDDLETOWN, N. Y.—Middletown Telephone Company has been organized. Directors, L. S. Stivers, J. L. Wiggins, F. M. Stratton, R. C. Tuthill, Jr., T. D. Mills, Edwin Fancher, J. E. Iseman, A. B. Wilbur, L. V. Sinsabaugh, G. A. Swalm, Jr., J. J. Silk, Frank Harding and T. A. Weller.

MONTROSE, PA.—The Montrose Telephone and Telegraph Company has been organized. President, F. I. Lott; secretary, W. C. Cruser; treasurer, H. D. Jones; directors, A. Lathrop, J. F. Butterfield, D. V. Gardiner, J. S. Whiting, W. W. Reynolds.

SANTA FE, N. M.—The La Belle Telephone Company has been incorporated. Objects, building, owning and maintaining telephone lines in the territory of New Mexico. Capital stock, $50,000. Directors, H. C. Fortson, J. W. Bayne, F. P. Twitchell, A. G. Slith and E. C. Van Driest. Principal place of business, town of La Belle, Toas County.

HARRISBURG, PA.—A charter has been granted to the New Castle Telephone Company. Capital, $16,000.

COLUMBIA, S. C.—A charter has been granted to the Winnsboro and Ridgeway Telephone Company. The capital stock is $300. The directors are E. C. Heins, James Q. Davis, W. M. Doty, W. D. Douglass.

OSHKOSH, WIS.—The Oshkosh Northwestern Telephone Company has been organized with a capital stock of $20,000. The stockholders are 17 in number and include some of the wealthiest men in the city. The company claims to have a list of 280 subscribers.

OSKALOOSA, IA.—The Oskaloosa Telephone Company has been organized by business men of Oskaloosa. The capital stock is $20,000 and the principal place of business is in the city of Oskaloosa and connections with surrounding mining towns.

NYACK, N. Y.—The Rockland Telephone and Telegraph Company has been organized for the purpose of constructing a telephone line throughout the county. The officers of the company are: Wm. R. Thompson, president; A. A. Demarest, vice-president; Lewis H. Hutton, secretary; George A. Blauvelt, treasurer; and Wm. Dewey, chairman of the executive committee.

SAN JOSE, CAL.—A telephone company is to be established here.

ST. LOUIS, MO.—The Dryden & Spratt Telephone Company, of Taylor Place, has been incorporated. Capital stock, $500.

AMHERST, MASS.—A telephone system is to be established here.

LEAVENWORTH, KAS. — The Interstate Long-Distance Telephone Company, of Leavenworth, with a capital of $100,000. The directors are as follows: W. T. Hewitt, W. N. Todd, J. W. Folger, A. Rothentier and L. P. Rothschild.

RAVENNA, OHIO.—The Portage Telephone Company has been incorporated. Capital stock, $25,000.

Electric Light and Power.

MORRISVILLE, VT.—The electric plant, which has been recently put in operation by C. H. Almon, is running smoothly and will be accepted shortly by the village trustees, when the 30 days' trial will expire.

TAMPA, FLA.—An electric light plant is to be established.

BRISTOL, TENN.—The Bristol Gas and Electric Company has been incorporated with Capt. J. H. Word president.

LYNCHBURG, VA.—Steps are being taken to build and operate an electric light plant.

ROPER CITY, N. C.—Steps are being taken to establish an electric light plant.

BARDSTOWN, KY.—O. Arnold and others are endeavoring to establish an electric light plant.

NEWARK, N. J.—The Hackensack Electric Light Company; plant sold to the gas company for $24,000.

KEY WEST, FLA.—Wm. Curry's Sons propose to establish an electric plant here.

SUFFIELD, CONN.—The Suffield Electric Light Company has been incorporated with the following incorporators: William L. Loomis, I. Luther Spencer, Edward A. Fuller, Calvin C. Spencer, Leavitt P. Bissell, Charles C. Bissell, A. N. Graves, George F. Kendall, S. W. Clark, Waldo S. Knox, J. W. Spelman, J. B. Fairfield, Leverett N. Austin, W. E. Graves, R. F. Brome, A. R. Pierce, Edmund Hallady and W. W. Cooper.

HARRISBURG, PA.—Belle Vernon Electric Light and Power Company has been incorporated with a capital stock of $1,000.

ST. ALBANS, VT.—A new electric light plant is to be established.

Business Troubles.

PHILADELPHIA, PA.—Nardi, Strang & Company, electrical works, reported as having assigned.

NEW YORK CITY.—Charles E. Chapin, dealer in electrical supplies at 136 Liberty street, made an assignment on April 29 to John K. Creevey, giving a preference to M. A. Glazier Chapin, his wife, the amount not being mentioned.

NEW YORK CITY.—John Kean has been appointed receiver for the Woolf Electric Disinfecting Company, of New York, whose office is at 66 Broad street, and factory at Ravenswood, L. I., on the application of John H. Miller, the counsel for the company, who is a creditor for $3,855. He says the company's liabilities are about $33,000, and its assets probably $5,000. The company was incorporated on May 5, 1893, under New Jersey laws, with a capital stock of $2,000,000. Hazen L. Hoyt, formerly proprietor of the Victoria Hotel, is the president, and is a creditor for $25,349. A year ago the company made experiments for the city authorities on the croton water at Brewsters and on sewage at the foot of Canal street, North River.

New Manufacturing Companies.

ALVARADO, TEX.—The Alvarado Water Supply and Electric Company has been organized by M. Sansom, H. R. Jones, T. B. Pope, E. P. Reynolds and others. Capital stock, $10,000.

CHICAGO, ILL.—Big Four Electric Company has been incorporated; capital stock, $200,000. To manufacture electric apparatus. Incorporators, William H. Brown, Louis K. Gillson and Henry G. Ames.

DES MOINES, IA.—Great Western Electric Company has been incorporated. The incorporators are W. A. Drake, R. H. Smith and Harry K. Allen, all of Cook County, Illinois. The company will conduct an electrical manufacturing business, the principal place of business being Des Moines. The authorized capital stock is $500,000, $200,000 of which is preferred. There are 5,000 shares of stock.

CHICAGO, ILL.—The Cardinal Curative Company has been incorporated to manufacture medical and electrical apparatus. Capital stock, $100,000. Incorporators, James Edwards, De le Motte Patter and R. D. Coles.

A Brake and Power Controller Combined.

A new device for controlling cars propelled by electricity has been recently invented by Mr. A. W. Mitchell, of Boston, Mass., and applied to a car of the Lynn & Boston Railroad at Boston, with what are reported to be perfectly satisfactory results. The present brake and power cranks are done away with, and in place of them is used a wheel, similar to that used on the brake of a steam railway car. This wheel operates both brake and power. Turning to the right shuts off power and sets up the brake, while turning to the left lets off the brake and turns on the power. The advantages claimed for this device are :

1. The reduction of the liability of accident by motormen becoming confused, as is often the case in an emergency, to the minimum. Under the old system he has a crank in each hand, sometimes turning one one way and the other another. With this device he has only one implement to handle, and both hands to do it with ; he has only one motion to make or think of for safety—turn to the right.

2. Under the present system the waste by motormen using brake and power at the same time is claimed to be enormous, amounting in some cases by actual experiment to 20 and 25 per cent of the power required to run the car. With this device this waste is entirely obviated, as it is impossible to use power and brake at the same time.

3. Brake shoes are renewed every 15 or 20 days under the present system, while with this device their life is extended to two or three times that length of time.

A recent trial of this device was witnessed by a number of railroad men from Boston and vicinity, and was pronounced by all a great success. With a motorman entirely new to the device, the car was started and stopped with as much ease and celerity as though he had run such a car for months. The device was put to the hardest tests and withstood all. performing its work in a perfectly satisfactory manner. Any information relative to it will be furnished upon application to Geo. A. Copeland, Room 137, P. O. Building, Boston, Mass.

A Curious Electric Discharge.

Mr. Gus. Schade, of Anaheim, Cal., writes as follows to the *Scientific American:*

I am making asphalt pipe. The process is as follows: Crude asphaltum and gravel, equal parts by measure, are each heated in separate kettles to 400 degrees Fahrenheit, then both are mixed together and filled into sheet iron moulds. The space between the moulds is maintained by a cast-iron ring on the bottom and the moulds are held to that ring by inside and outside wrought iron rings. After the moulds are cooled off, which takes time, according to the size of the pipe, from two to eight hours, they spring off from the pipe after the wrought iron rings have been removed and the moulds tapped with a hammer. Just at the moment the moulds spring off there can at times be seen large sparks between the sheet iron and the pipe. By having my hands on the pipe and the moulds I received sometimes such heavy shocks as to draw my arms together. Men working for me have experienced the same.

The object of this letter is to find out if you or any of your readers can explain how this electricity, for such is what I judge it to be, accumulated there, and why it discharges just at the moment the moulds are taken off.

The editor thinks the description suggests that a condenser is formed by the combination, which is discharged on opening the mould. Whence the charge is derived is not clear.

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POLES. BEING in the heart of the chestnut timber country we can furnish chestnut poles at moderate prices. Write us.

D. S. DRAKE, Huntingdon, Pa.

PROPOSALS WANTED

City Clerk's Office,
New Castle, Pa., April 22, 1895.

Sealed Proposals will be received until 12 o'clock noon of May 13, 1895, for 110 electric arc lights, for a term of five years.

Bids to be addressed to S. Link, Chairman Police Committee.

Specifications and Proposal Blanks can be obtained by addressing

FRANK TIDBALL,
City Clerk.

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1,000 OCTAGON PINE POLES,

26 to 28 ft. long. Other Sizes Cut to Order.

J. T. DENNY & CO., BUIE, N. C.

FIRE.

The destruction of our Works by fire on the 7th inst. was almost complete.
We have already resumed manufacturing and are making limited shipments, which are daily increasing.
Send us your orders. We will fill them with reasonable despatch, or advise you promptly if we cannot.

CROCKER-WHEELER ELECTRIC COMPANY,

Manufacturers and Electrical Engineers.

New York. Chicago. Boston. Philadelphia.

Sizes up to 250 H. P.

BUCKEYE INCANDESCENT LAMPS

QUALITY UNEQUALED. FACTORY PRODUCTION TRIPLED.

THE BUCKEYE ELECTRIC CO.,

Monadnock Building, Chicago. - - - - Cleveland, Ohio.

HUNDRED INTERESTS

The Metropolitan Electric Company, of Chicago, have placed on exhibit in their store a sample board showing a complete assortment of pliers, splicing clamps, vises, etc.

Huebel & Manger, 286 to 290 Graham street, Brooklyn, N. Y., makers of electrical and brass goods, have issued a new catalogue of electric bells, push buttons and house goods, which contains a very complete line of desirable specialties.

The Central Electric Company, 173 and 175 Adams street, Chicago, has issued a very tastefully designed brochure illustrating and describing the Lundell fan motors for direct and alternating currents. These fans are sure to create a stir in any atmosphere.

The Westinghouse Electric and Manufacturing Company is reported to be working day and night forces at its new factory at Brinton, Pa., and has on full time 2,700 factory hands. The output in the railway department is 25 motors per day, and will soon be increased to 30, for the new type of street railway motor known as No. 12.

The Automatic Electrical Specialty Company, 136 Liberty street, New York city, announce that they have a factory equipped for the sole purpose of making battery and series incandescent lamps. They can supply battery lamps from one-half to 16 candle-power, series lamps of all kinds and candelabra lamps to burn in multiple on 110 volts.

The Electric Heat Alarm Company, of Boston, through their agent at St. Paul, have contracted to equip the Ryan Hotel, the largest in the city, with their system of automatic fire alarms. When completed, it will be one of the best in the country. The company have just finished a very nice office outfit with their factory, hotel, journal bearing and marine systems for the Continental Commerce Company, 44 Pine street., New York, and 70 Oxford street, London, Eng.

REMOVAL NOTICES.

The Auerbach-Woolverton Electric Company have removed their offices and factory to 113 and 115 Adams street, Hoboken, N. J.

The Correspondence School of Technology, of Cleveland, Ohio, have moved their offices from the Brainard Block to the Cuyahoga Building, the best electrical building in the city.

B. J. Arnold has removed his offices from 574 to 576 The Rookery to Suite 1541 Marquette Building, corner Dearborn and Adams streets, Chicago. Mr. Arnold's telephone number is 4072 Main.

The Wallace Electric Company, of Chicago, have removed their store to 305 Dearborn street, next door to their old location. In their new quarters they have double the space and very much better facilities in every way. Business is improving with the Wallace company, and they report having done a rushing business of late in Stanley apparatus.

KIND WORDS.

THE "ELECTRICAL REVIEW" IS WIDELY READ.

To the Editor of Electrical Review:

I have received a very nice letter from the factory in England of the Brittania oil engine, mentioning having seen my letter which you so kindly published.

I speak of this to show how widely the Electrical Review is read.

Yours very truly,
CHAS. H. MINCHEW.
Taunton, Mass., April 24.

IMPATIENT TO GET THE "REVIEW."

To the Editor of Electrical Review:

Your paper comes to me every week and I find myself looking forward until I get the next.

Respectfully, W. S. G.
Barnesville, Ohio.

FOREVER.

To the Editor of Electrical Review:

I have taken your paper from its beginning and expect to continue.

Yours very truly,
A. G. WATERHOUSE.
Hartford, Conn., April 30, 1895.

It is reported that for the first three months of this year the earnings of the Central Union Telephone Company, a licensed company of the American Bell Telephone Company, operating in Illinois, Indiana, Iowa and Ohio, were $45,000 ahead of earnings for the same period in 1894. This company has had to bear a great deal of competition

FORÉE BAIN,
ELECTRICAL AND MECHANICAL ENGINEER,
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MONADNOCK BLDG., CHICAGO.

ELECTRICITY
Mechanics; Mechanical Drawing; Architecture; Architectural Drawing and Designing; Masonry; Carpentry and Joinery; Ornamental and Structural Iron Work; Steam Engineering (Stationary, Locomotive or Marine); Railroad Engineering; Bridge Engineering; Municipal Engineering; Plumbing and Heating; Coal and Metal Mining; Prospecting, and the English Branches. Until further notice experimental apparatus will be furnished *free* to students. Send for Free Circular, stating the subject you wish to study, to
TAUGHT BY MAIL THOROUGH PRACTICAL
THE INTERNATIONAL CORRESPONDENCE SCHOOLS, Scranton, Pa.

ELECTRICIAN WANTED.
Large manufacturing house in Chicago wants competent man to take charge of isolated plant — arcs, incandescent — both alternating and direct-motors. Must be well posted and a hustler. Give age, experience, references and salary expected.
ELECTRICAL ENGINEERING,
1105 The Rookery, - CHICAGO.

Deer Park, On the Crest of the Alleghanies.
To those contemplating a trip to the mountains in search of health and pleasure, Deer Park, on the crest of the Alleghany mountains, 3,000 feet above the sea level, offers such varied attractions as a delightful atmosphere during both day and night, pure water, smooth, winding roads through the mountains and valleys, and the most picturesque scenery in the Alleghany range. The hotel is equipped with all the adjuncts conducive to the entertainment, pleasure and comfort of its guests.
The surrounding grounds, as well as the hotel, are lighted with electricity. Six miles distant, on the same mountain summit, is Oakland, the twin resort of Deer Park, and equally as well equipped for the entertainment and accommodations of its patrons. Both hotels are upon the main line of the Baltimore and Ohio Railroad, have the advantages of its splendid Vestibuled Limited Express trains between the East and West. Season Excursion tickets, good for return passage until October 31, will be placed on sale at greatly reduced rates at all principal ticket offices throughout the country. One-way tickets, reading from St. Louis, Louisville, Cincinnati, Columbus, Chicago and any point on the B. & O. system to Washington, Baltimore, Philadelphia or New York, or *vice versa*, are good to stop off at either Deer Park, Mountain Lake Park or Oakland, and the time limit will be extended by agents at either resort upon application, to cover the period of the holder's visit.
The season at these popular resorts commences June 22.
For full information as to hotel rates, rooms, etc., address George D. DeShields, manager, Deer Park, or Oakland, Garret County, Md.

Storage Batteries
FOR ALL PURPOSES.
Bradbury-Stone Electric Storage Co.,
LOWELL, - MASS.

TELEPHONE RATES.
The improved New York City Exchange Telephone Service, metallic Circuit Lines, long distance equipment, is now offered by us at rates which bring it within reach of even the most moderate users. The prices per year are as follows:
Combination Line, $80.00
Direct Line, - $120.00
And Upwards, According to Use.
No Extra Installation Charge.
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45 BROADWAY, NEW YORK,
PATENTS AND PATENT LAW.

ELECTRO-MAGNETS
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ELECTRICAL PURPOSES.
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THE LEHIGH VALLEY
CREOSOTING CO.
WORKS, PERTH AMBOY, N. J.
Office, Rooms 126 and 127, 1 Broadway, NEW YORK.
Creosoted Lumber, Underground Conduits. Telegraph Poles, Piling and Ties Furnished.

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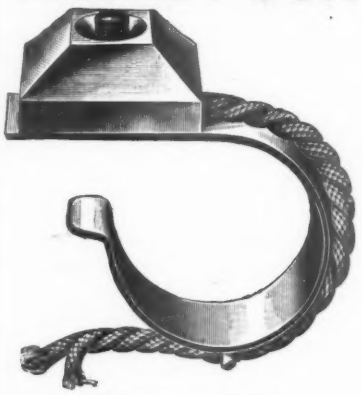
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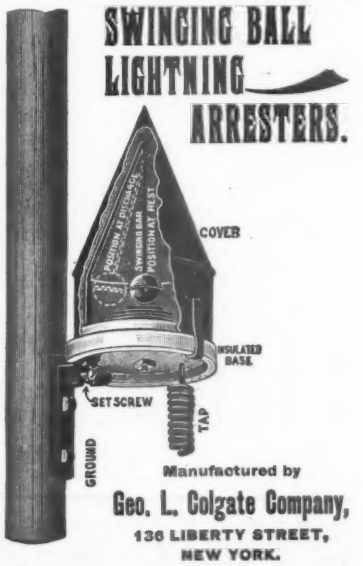

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Sight Feed Oil Cups. AUTOMATIC "WIPING DEVICE"
For oiling Crank and Cross-head Pins.
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